JOB VIBRATION TEST - DSKY
JDC: 05387 **REV:** C **PAGE** 1 **OF** 6
INITIAL TDRR 32541 **D.S. PGS.** 1

SUBSYSTEM Apollo Guidance Computer
ASSY:

DESCRIPTION:

DSKY displays and switch chatter are monitored while the DSKY is vibrated along each axis for two minutes as follows:

3DB/octave rollup 10 HZ to $0.04g^2$/HZ at 70 HZ; $0.04g^2$/HZ to 420 HZ; 3DB/octave rolloff from 420 HZ to 2000 HZ.

Ⓜ

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
C	8-17-67	34350	1,2,5,6	1	[illegible]	[illegible]

REFERENCES:
PS 2016007
PS 2016015

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Mount the DSKY vibration fixture on the vibration table in the XCM axis.
2. Mount accelerometer on DSKY vibration fixture in the XCM axis.
3. Remove the DSKY from the DSKY handling fixture. Install the DSKY in its vibration fixture as described in Figure 1.

NOTE: The "g" vector will be down in all axes of vibration.

4. Assure that all ropes are installed in their proper position.
5. Assure that all RDC Interface Panel switches are OFF.
6. Press CH30-15 to ON, and connect DSKY vibration cables.
7. Press ON INHIBIT PWR FAIL.

DATE________

JOB: VIBRATION TEST - DSKY
JDC: 05387 **REV:** C **PAGE** 2 **OF** 6

SUBSYSTEM: Apollo Guidance Computer
ASSY:

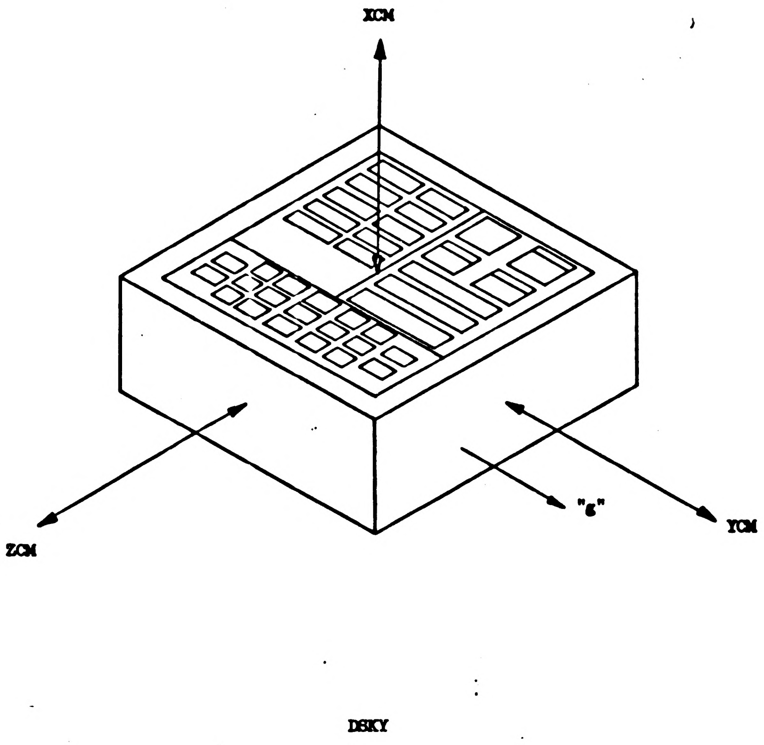


Figure 1

DATE________

JOB: VIBRATION TEST - DSKY
JDC: 05387 **REV:** C **PAGE** 3 **OF** 6

SUBSYSTEM: Apollo Guidance Computer
ASSY:

A. PREPARATION (Cont'd)

7. **On the Operations Console set the AGC MARGINS switch to the OSC position.**
8. **Assure that PARITY FAIL switch is OFF.**
9. **Set Register Select switch to A.**
10. **Set the ALGA switch to OFF.**
11. **Set T12, INHIBIT INTERRUPT and INHIBIT INCREMENTS switches to ON.**

B. PROCEDURE

1. **On the Operations Console set the AGC POWER switch to ON.**
2. **Press the NAV DSKY ALARM KB ON switch to ON.**

   The DSKYs shall be vibrated as follows:

   3DB/octave rollup from 10 HZ to $0.04g^2$/HZ at 70 HZ; $0.04g^2$/HZ to 420 HZ; 3DB/octave rolloff from 420 HZ to 2000 HZ.

Tolerance limits for 10 HZ to 50 HZ	**± 3DB**
Tolerance limits for 50 HZ to 1000 HZ	**± 1.5DB**
Tolerance limits for 1000 HZ to 2000 HZ	**± 3DB**

NOTE: Two complete cycles. For cycle no. 1 perform steps 1 thru 7. For cycle no. 2 perform steps 10 thru 25. Total time for both cycles shall be not less than 2 minutes.

3. **Perform steps B1 thru B55 of JDC 05379.**
4. **During the success display in B6 of JDC 05387 press the DSKY keys in the following order: RSET, RSET, and KEY REL.**

NOTE: The second RSET should insure RESTART indicator is OFF during remainder of test after the first cycle of the DSKY display.

DATE________

JOB: VIBRATION TEST - DSKY
JDC: 05387 **REV** C **PAGE** 4 **OF** 6

SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (cont.)

5. Verify the following DSKY displays:
   a. displays blank except RESTART indicator is ON.
   b. all 9's, + signs, VERB and NOUN numbers and KEY REL and OPR ERR alarms flashing; remaining alarms and COMP ACTY indicator ON steady.
   c. all 8's, - signs,
   d. all 7's
   e. all 6's
   f. all 5's
   g. all 4's
   h. all 3's
   i. all 2's
   j. all 1's
   k. all 0's
   l. all positions blank
6. Verify the following DSKY displays:

REG1	70707
REG3	number of failures since start of JDC
VERB	00
NOUN	01
PROG	01
REG2	number represents the times thru one complete loop.

7. Start vibration cycle no. 1 as outlined in step B2.
8. At the end of vibration cycle no. 1, set T12, Inhibit Increments and Inhibit Interrupt switches to ON.

DATE________

JOB: VIBRATION TEST - DSKY
JDC: 05387 REV C PAGE 5 OF 6
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (Cont'd.)

9. Press FRESH START and PROCEED.

10. Press KEYBOARD LOAD and CL.

11. Press INHIBIT BANK RESTORE to ON.

12. Press keys in the following order: 00004 22000.

13. Press EXECUTE.

14. Verify that the FBK register displays: 01 001.

15. Press INHIBIT BANK RESTORE to OFF.

16. Press TRANSFER CONTROL and CL.

17. Press keys in the following order: 3756.

18. Press EXECUTE and MONITOR.

19. Set T12, INHIBIT INCREMENTS and INHIBIT INTERRUPT switches to OFF.

20. Press PROCEED.

21. Verify that REG1, REG2, REG3, VERB, NOUN, and PROG registers of the DSKY are blank.

22. Start vibration cycle no. 2 as outlined in Step B2.

23. During DSKY vibration if there is a voluntary or involuntary entry, REG1 of the DSKY will increment one digit for each entry, beginning with a REG1 display of: 00001.

24. Press DSKY ALARM KB OFF switch.

25. On the Operations console, set the AGC power switch to OFF.

DATE________

JOB: VIBRATION TEST - DSKY
JDC: 05387 REV: C PAGE 6 OF 6
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (Cont'd)

26. Reposition the DSKY vibration fixture on the vibration table in the ZCM axis.

27. Mount the accelerometer on the DSKY vibration fixture in the ZCM axis.

28. Repeat steps B1 thru B25 of this JDC.

29. Reposition DSKY vibration fixture on the vibration table in the YCM axis.

30. Mount the accelerometer on the DSKY vibration fixture in the YCM axis.

31. Repeat steps B1 thru B25 of this JDC.

32. Set T12, Inhibit Interrupt, and Inhibit Increments to ON.

33. Press the DSKY ALARMS OFF switch to OFF.

34. Press the AGC POWER OFF to OFF.

35. Verify that DSKY keys have not been dislodged during vibration.

36. Press OFF INHIBIT PWR FAIL.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05387
REV. C
INITIAL TDRR 32541

JOB: VIBRATION TEST - DSKY

ASSEMBLY UNDER TEST	**TEST HISTORY**		
TITLE Apollo Guidance Computer	DATE ______ START	______ END	______ SITE/LOCATION
SER. NO. ______ DWG. ______ REV. ______	TIME ______ START	______ END	______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ ______ CAL DATE
NAME ______ SER. NO. ______ ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

B. PROCEDURE

	Results	Limits
1. Steps 1 thru 36 performed with no indication of failure	______	Testman's Stamp

DATE ______

JOB: VIBRATION TEST - DSKY

JDC: 05387 **REV:** D **PAGE** 1 **OF** 6

INITIAL TDRR 32541 D.S. PGS. 1

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

DSKY displays and switch chatter are monitored while the DSKY is vibrated along each axis for two minutes as follows:

3DB/octave rollup 10 HZ to 0.04g^2/HZ at 70 HZ; 0.04g^2/HZ to 420 HZ; 3DB/octave rolloff from 420 HZ to 2000 HZ.

NOTE: Record all Vibration time (Preliminary Test & Final Sale).

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
C	8-17-67	34350	1,2,5,6	1	[illegible]	[illegible]
D	10-13-67	34851	1,3,4,5,6	1,2	[illegible]	[illegible]

REFERENCES:

PS 2016007
PS 2016015

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Mount the DSKY vibration fixture on the vibration table in the XCM axis.
2. Mount accelerometer on DSKY vibration fixture in the XCM axis.
3. Remove the DSKY from the DSKY handling fixture. Install the DSKY in its vibration fixture as described in Figure 1.

NOTE: The "g" vector will be down in all axes of vibration.

4. Assure that all ropes are installed in their proper position.
5. Assure that all RDC Interface Panel switches are OFF.
6. Press CH30-15 to ON, and connect DSKY vibration cables.
7. Press ON INHIBIT PWR FAIL.

DATE ________

JOB: VIBRATION TEST - DSKY

JDC: 05387 **REV:** D **PAGE** 2 **OF** 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

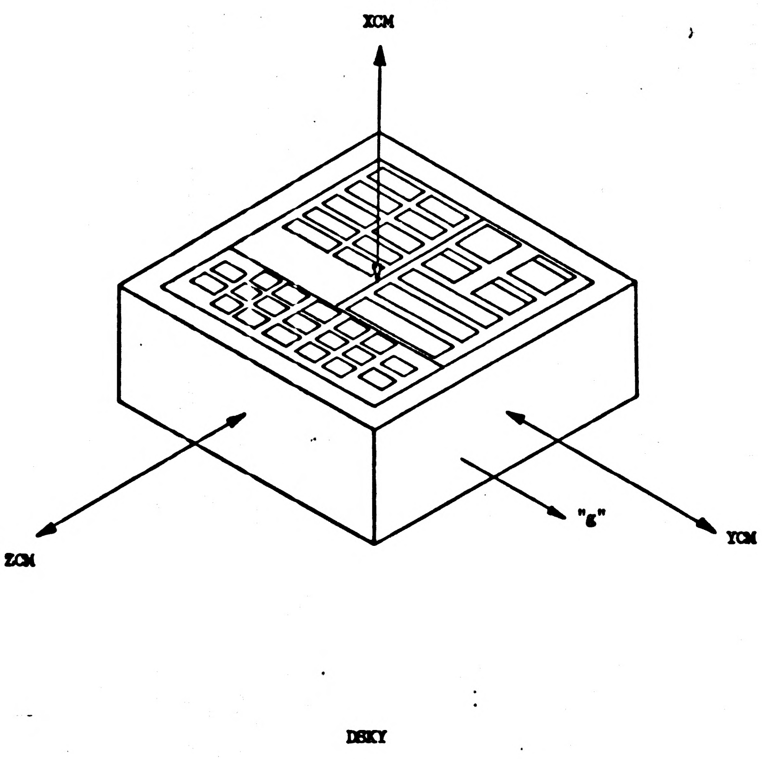


Figure 1

DATE ________

JOB: VIBRATION TEST - DSKY

JDC: 05387 **REV** D **PAGE** 3 **OF** 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

A. PREPARATION (Cont'd)

8. On the Operations Console set the AGC MARGINS switch to the OSC position.
9. Assure that PARITY FAIL switch is OFF.
10. Set Register Select switch to A.
11. Set the ALGA switch to OFF.
12. Set T12, INHIBIT INTERRUPT and INHIBIT INCREMENTS switches to ON.

B. PROCEDURE

1. On the Operations Console set the AGC POWER switch to ON.
2. Press the NAV DSKY ALARM KB ON switch to ON.

The DSKYs shall be vibrated as follows:

3DB/octave rollup from 10 HZ to 0.04g^2/HZ at 70 HZ; 0.04g^2/HZ to 420 HZ; 3DB/octave rolloff from 420 HZ to 2000 HZ.

Tolerance limits for 10 HZ to 50 HZ	± 3DB
Tolerance limits for 50 HZ to 1000 HZ	± 1.5DB
Tolerance limits for 1000 HZ to 2000 HZ	± 3DB

NOTE: Two complete cycles. For cycle no. 1 perform steps 1 thru 7. For cycle no. 2 perform steps 10 thru 25. Total time for both cycles shall be not less than 2 minutes.

3. Perform steps B1 thru B55 of JDC 05379.
4. During the success display in B6 of JDC 05387 press the DSKY keys in the following order: RSET, RSET, and KEY REL.

NOTE: The second RSET should insure RESTART indicator is OFF during remainder of test after the first cycle of the DSKY display.

DATE ________

JOB: VIBRATION TEST - DSKY

JDC: 05387 **REV** D **PAGE** 4 **OF** 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (cont.)

5. Verify the following DSKY displays:
   - a. displays blank except RESTART indicator is ON.
   - b. all 9's, + signs, VERB and NOUN numbers and KEY REL and OPR ERR alarms flashing; remaining alarms and COMP ACTY indicator ON steady.
   - c. all 8's, - signs,
   - d. all 7's
   - e. all 6's
   - f. all 5's
   - g. all 4's
   - h. all 3's
   - i. all 2's
   - j. all 1's
   - k. all 0's
   - l. all positions blank
6. Verify the following DSKY displays:

REG1	70707
REG3	number of failures since start of JDC
VERB	00
NOUN	01
PROG	01
REG2	number represents the times thru one complete loop.

7. Start vibration cycle no. 1 as outlined in step B2. Record Vibration Time.
8. At the end of vibration cycle no. 1, set T12, Inhibit Increments and Inhibit Interrupt switches to ON.

DATE ________

JOB: VIBRATION TEST - DSKY
JDC: 05387 REV D PAGE 5 OF 6
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (Cont'd.)

9. Press FRESH START and PROCEED.

10. Press KEYBOARD LOAD and CL.

11. Press INHIBIT BANK RESTORE to ON.

12. Press keys in the following order: 00004 22000.

13. Press EXECUTE.

14. Verify that the FBK register displays: 01 001.

15. Press INHIBIT BANK RESTORE to OFF.

16. Press TRANSFER CONTROL and CL.

17. Press keys in the following order: 3756.

18. Press EXECUTE and MONITOR.

19. Set T12, INHIBIT INCREMENTS and INHIBIT INTERRUPT switches to OFF.

20. Press PROCEED.

21. Verify that REG1, REG2, REG3, VERB, NOUN, and PROG registers of the DSKY are blank.

22. Start vibration cycle no. 2 as outlined in Step B2. Record Vibration Time.

23. During DSKY vibration if there is a voluntary or involuntary entry, REG1 of the DSKY will increment one digit for each entry, beginning with a REG1 display of: 00001.

24. Press DSKY ALARM KB OFF switch.

25. On the Operations console, set the AGC power switch to OFF.

DATE________

JOB: VIBRATION TEST - DSKY
JDC: 05387 REV: D PAGE 6 OF 6
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (Cont'd)

26. Reposition the DSKY vibration fixture on the vibration table in the ZCM axis.

27. Mount the accelerometer on the DSKY vibration fixture in the ZCM axis.

28. Repeat steps B1 thru B25 of this JDC.

29. Reposition DSKY vibration fixture on the vibration table in the YCM axis.

30. Mount the accelerometer on the DSKY vibration fixture in the YCM axis.

31. Repeat steps B1 thru B25 of this JDC.

32. Set T12, Inhibit Interrupt, and Inhibit Increments to ON.

33. Press the DSKY ALARMS OFF switch to OFF.

34. Press the AGC POWER OFF to OFF.

35. Verify that DSKY keys have not been dislodged during vibration.

36. Press OFF INHIBIT PWR FAIL.

37. Record whether Steps 1 thru 36 were performed with no indication of failure.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

JDC
NO. 05387
REV. D
INITIAL TDRR 32541

JOB: VIBRATION TEST - DSKY

ASSEMBLY UNDER TEST

TITLE Apollo Guidance Computer
SER. NO. ______ DWG. ______ REV. ____

TEST HISTORY

DATE ______ START ______ END ______ SITE/LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION
APPROVED BY ______ NAME/AFFILIATION

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 05387
REV. D

JOB: VIBRATION TEST - DSKY

B. PROCEDURE

Step 7 & 22 DSKY Vibration Time

DATE	TESTMAN'S STAMP	XCM AXIS VIBRATION	YCM AXIS VIBRATION	ZCM AXIS VIBRATION

37. Steps 1 thru 36 performed with no indication of failure.

______ Testman's Stamp

DATE ______

JOB: VIBRATION TEST - DSKY	JDC: 05387 REV: E PAGE __ OF 6
	INITIAL TDRR 32541 D.S PGS. 2
SUBSYSTEM: Apollo Guidance Computer	ASSY:

DESCRIPTION:

DSKY displays and switch chatter are monitored while the DSKY is vibrated along each axis for two minutes as follows:

3DB/octave rollup 10 HZ to $0.04g^2$/HZ at 70 HZ; $0.04g^2$/HZ to 420 HZ; 3DB/octave rolloff from 420 HZ to 2000 HZ.

NOTE: Record all Vibration time (Preliminary Test & Final Sale).

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL		REFERENCES:
			JDC	D.S.	MIT	NASA	PS 2016007 PS 2016015
C	8-17-67	34350	1,2,5,6	1	[illegible]	[illegible]	
D	10-13-67	34851	1,3,4,5,6	1,2	[illegible]	[illegible]	
E	3-2-68	35840	1,3,5,6	2	[illegible] FM	[illegible] FM	IMPORTANT:
							INTERVAL:
							TOOLS AND MATERIAL:

A. PREPARATION

1. Mount the DSKY vibration fixture on the vibration table in the XCM axis.
2. Mount accelerometer on DSKY vibration fixture in the XCM axis.
3. Remove the DSKY from the DSKY handling fixture. Install the DSKY in its vibration fixture as described in Figure 1.

NOTE: The "g" vector will be down in all axes of vibration.

4. Assure that all ropes are installed in their proper position.
5. Assure that all HDC Interface Panel switches are OFF.
6. Press CH30-15 to ON, and connect DSKY vibration cables.
7. Press ON INHIBIT PWR FAIL.

DATE________

JOB: VIBRATION TEST - DSKY	JDC: 05387 REV: E PAGE 2 OF 6
SUBSYSTEM: Apollo Guidance Computer	ASSY:

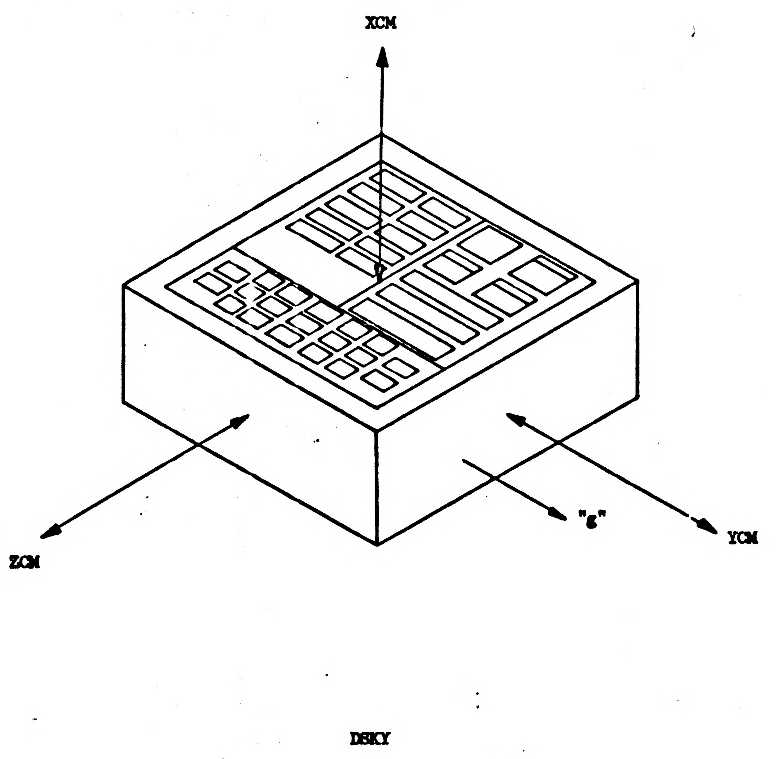


Figure 1

DATE________

JOB: VIBRATION TEST - DSKY	JDC: 05387 REV: - E PAGE 3 OF 6
SUBSYSTEM: Apollo Guidance Computer	ASSY:

A. **PREPARATION (Cont'd)**

8. **On the Operations Console set the AGC MARGINS switch to the OSC position.**
9. **Assure that PARITY FAIL switch is OFF.**
10. **Set Register Select switch to A.**
11. **Set the ALGA switch to OFF.**
12. **Set T12, INHIBIT INTERRUPT and INHIBIT INCREMENTS switches to ON.**

B. **PROCEDURE**

1. **On the Operations Console set the AGC POWER switch to ON.**
2. **Press the MAIN DSKY and NAV DSKY ALARM KB ON switches to ON.**

The DSKYs shall be vibrated as follows:

3DB/octave rollup from 10 HZ to $0.04g^2$/HZ at 70 HZ; $0.04g^2$/HZ to 420 HZ; 3DB/octave rolloff from 420 HZ to 2000 HZ.

Tolerance limits for 10 HZ to 50 HZ	**± 3DB**
Tolerance limits for 50 HZ to 1000 HZ	**± 1.5DB**
Tolerance limits for 1000 HZ to 2000 HZ	**± 3DB**

NOTE: Two complete cycles. For cycle no. 1 perform steps 1 thru 7. For cycle no. 2 perform steps 10 thru 25. Total time for both cycles shall be not less than 2 minutes.

3. **Perform steps B1 thru B55 of JDC 05379.**
4. **During the success display in B6 of JDC 05387 press the DSKY keys in the following order: RSET, RSET, and KEY REL.**

NOTE: The second RSET should insure RESTART indicator is OFF during remainder of test after the first cycle of the DSKY display.

DATE________

JOB: VIBRATION TEST - DSKY	JDC: 05387 REV E PAGE 4 OF 6
SUBSYSTEM: Apollo Guidance Computer	ASSY:

B. **PROCEDURE (cont.)**

5. **Verify the following DSKY displays:**
   - a. **displays blank except RESTART indicator is ON.**
   - b. **all 9's, + signs, VERB and NOUN numbers and KEY REL and OPR ERR alarms flashing; remaining alarms and COMP ACTY indicator ON steady.**
   - c. **all 8's, - signs,**
   - d. **all 7's**
   - e. **all 6's**
   - f. **all 5's**
   - g. **all 4's**
   - h. **all 3's**
   - i. **all 2's**
   - j. **all 1's**
   - k. **all 0's**
   - l. **all positions blank**
6. **Verify the following DSKY displays:**

REG1	**70707**
REG3	**number of failures since start of JDC**
VERB	**00**
NOUN	**01**
PROG	**01**
REG2	**number represents the times thru one complete loop.**

7. **Start vibration cycle no. 1 as outlined in step B2. Record Vibration Time.**
8. **At the end of vibration cycle no. 1, set T12, Inhibit Increments and Inhibit Interrupt switches to ON.**

DATE________

JOB: VIBRATION TEST - DSKY | JDC: 05387 REV: E PAGE 5 OF 6

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

9. Press FRESH START and PROCEED.

10. Press KEYBOARD LOAD and CL.

11. Press INHIBIT BANK RESTORE to ON.

12. Press keys in the following order: 00004 22000.

13. Press EXECUTE.

14. Verify that the FBK register displays: 01 001.

15. Press INHIBIT BANK RESTORE to OFF.

16. Press TRANSFER CONTROL and CL.

17. Press keys in the following order: 3756.

18. Press EXECUTE and MONITOR.

19. Set T12, INHIBIT INCREMENTS and INHIBIT INTERRUPT switches to OFF.

20. Press PROCEED.

21. Verify that REG1, REG2, REG3, VERB, NOUN, and PROG registers of the DSKY are blank.

22. Start vibration cycle no. 2 as outlined in Step B2. Record Vibration Time.

23. During DSKY vibration if there is a voluntary or involuntary entry, REG1 of the DSKY will increment one digit for each entry, beginning with a REG1 display of: 00001.

24. Turn T12, INHIBIT INCREMENTS, and INHIBIT INTERRUPT switches to ON, then set the MAIN DSKY and NAV DSKY ALARM KB OFF switches to OFF.

25. On the Operations console, set the AGC power switch to OFF.

DATE________

JOB: VIBRATION TEST - DSKY | JDC: 05387 REV: E PAGE 6 OF 6

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

26. Reposition the DSKY vibration fixture on the vibration table in the ZCM axis.

27. Mount the accelerometer on the DSKY vibration fixture in the ZCM axis.

28. Repeat steps B1 thru B25 of this JDC.

29. Reposition DSKY vibration fixture on the vibration table in the YCM axis.

30. Mount the accelerometer on the DSKY vibration fixture in the YCM axis.

31. Repeat steps B1 thru B25 of this JDC.

32. Verify that DSKY keys have not been dislodged during vibration.

33. Press OFF INHIBIT PWR FAIL.

34. Record whether Steps 1 thru 33 were performed with no indication of failure.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

JDC
NO. 05387
REV. E
INITIAL TDRR 32541

JOB: VIBRATION TEST - DSKY

ASSEMBLY UNDER TEST

TITLE Apollo Guidance Computer
SER. NO. ______ DWG. ______ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE/LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME __________ SER. NO. ______ CAL DATE
NAME __________ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 05387
REV. E

JOB: VIBRATION TEST - DSKY

B. PROCEDURE

Step 7 & 22 DSKY Vibration Time

DATE	TESTMAN'S STAMP	XCM AXIS VIBRATION	YCM AXIS VIBRATION	ZCM AXIS VIBRATION

34. Steps 1 thru 33 performed with no indication of failure.

________ Testman's Stamp

DATE________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 REV: A PAGE 1 OF 10
INITIAL TDRR 32541 D.S PGS 1

SUBSYSTEM Apollo Guidance Computer

ASSY:

DESCRIPTION:

Tests instructions, erasable memory, checks sum of program modules, special rope modules, interrupts and alarms, and input-output, and DSKYs (tests 1-60). These tests are run on the CTS and all fail and success patterns displayed on the CTS are described in this JDC.

Rev. Let	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	4-13-67	33584	1, 10	1	[illegible]	[illegible]

REFERENCES:
PS 2016007
PS 2016015

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Assure cable W263 is properly connected.
2. Assure that all Ropes are installed in their proper positions.
3. Assure that all RDC Interface Panel switches are OFF.
4. Press CH30-15 and CH33-10 to ON.
5. Assure PARITY FAIL switch is OFF.
6. Set Register Select switch to A.
7. Set the ALGA switch to OFF.
8. Press MONITOR.
9. Set INHIBIT INTERRUPTS, INHIBIT INCREMENT, and T12 switches to ON.

DATE________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 REV: A PAGE 2 OF 10

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE

1. Press FRESH START, PROCEED, and ALARM RESET.
2. Press KEYBOARD LOAD and CL.
3. Press keys in the following order: 00067 77777.
4. Press EXECUTE and CL.
5. Press keys in the following order: 00076 77777.
6. Press EXECUTE and CL.
7. Press keys in the following order: 00077 77777.
8. Press EXECUTE and CL.
9. Press keys in the following order: 00100 77777.
10. Press EXECUTE and CL.
11. Press keys in the following order: 00101 77777.
12. Press EXECUTE and CL.
13. Press keys in the following order: 00102 00003.
14. Press EXECUTE and CL.
15. Press keys in the following order: 00103 00771.
16. Press EXECUTE and CL.
17. Press keys in the following order: 00104 31574.
18. Press EXECUTE and CL.
19. Press keys in the following order: 00105 00612.
20. Press EXECUTE and CL.

DATE________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 REV: A PAGE 3 OF 10

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (cont'd)

21. Press keys in the following order: 00106 13606.
22. Press EXECUTE and CL.
23. Press keys in the following order: 00117 00001.
24. Press EXECUTE and CL.
25. Press keys in the following order: 00120 77700.
26. Press EXECUTE, READ AGC, and CL.
27. Press keys in the following order: 0067.
28. Press EXECUTE.
29. Verify that the REG SEL register indicates: 1111 111 111 111 111.
30. Press CL.
31. Press keys in the following order: 0076.
32. Press EXECUTE.
33. Verify that the REG SEL registerindicates: 1111 111 111 111 111.
34. Press CL.
35. Press keys in the following order: 0077.
36. Press EXECUTE.
37. Verify that the REG SEL register indicates: 1111 111 111 111 111.
38. Press CL.
39. Press keys in the following order: 0100.
40. Press EXECUTE.

DATE________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 REV: A PAGE 4 OF 10

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (cont'd)

41. Verify that the REG SEL register indicates: 1111 111 111 111 111.
42. Press CL.
43. Press keys in the following order: 0101.
44. Press EXECUTE.
45. Verify that the REG SEL register indicates: 1111 111 111 111 111.
46. Press CL.
47. Press keys in the following order: 0102.
48. Press EXECUTE.
49. Verify that the REG SEL register indicates: 0000 000 000 000 011.
50. Press CL.
51. Press keys in the following order: 0103.
52. Press EXECUTE.
53. Verify that the REG SEL register indicates: 0000 000 111 111 001.
54. Press CL.
55. Press keys in the following order: 0104.
56. Press EXECUTE.
57. Verify that the REG SEL register indicates: 0011 001 101 111 100.
58. Press CL.
59. Press keys in the following order: 0105.
60. Press EXECUTE.

DATE________

JOB: CTS CONTROL OF NEWSPEAK	JDC 05388 REV. A PAGE 5 OF 10
SUBSYSTEM: Apollo Guidance Computer	ASSY:

B. PROCEDURE

61. Verify that the REG SEL register indicates: 0000 000 110 001 010.
62. Press CL.
63 Press keys in the following order: 0106.
64. Press EXECUTE.
65. Verify that the REG SEL register indicates: 0001 011 110 000 110.
66. Press CL.
67. Press keys in the following order: 0117.
68. Press EXECUTE.
69. Verify that the REG SEL register indicates: 0000 000 000 000 001.
70. Press CL.
71. Press keys in the following order: 0120.
72. Press EXECUTE.
73. Verify that the REG SEL register indicates: 1111 111 111 000 000.
74. Press TRANSFER CONTROL AND CL.
75. Press keys in the following order: 4463.
76. Press EXECUTE and MONITOR.
77. Set T12, Inhibit Increments, and Inhibit Interrupt switches to OFF.
78. Press PROCEED.
79. Set ALGA to ON.

NOTE: If the subsystem contains two (2) DSKY's perform steps 80 and 81 with both DSKY's.

DATE________

JOB: CTS CONTROL OF NEWSPEAK	JDC: 05388 REV. A PAGE 6 OF 10
SUBSYSTEM: Apollo Guidance Computer	ASSY:

B. PROCEDURE (cont'd)

80. Verify the following DSKY displays:
    - a. displays blank except RESTART indicator is ON.
    - b. all 9's, + signs, VERB and NOUN numbers and KEY REL and OPR ERR alarms flashing; remaining alarms and COMP ACTY indicator ON steady.
    - c. all 8's, - signs, RESTART indicator ON.
    - d. all 7's
    - e. all 6's
    - f. all 5's
    - g. all 4's
    - h. all 3's
    - i. all 2's
    - j. all 1's
    - k. all 0's
    - l. all positions blank

81. Verify the following DSKY displays:

REG1	70707
REG3	number of failures since start of JDC
VERB	00
NOUN	74
MODE	74
REG2	number represents the times thru one complete loop.

DATE________

JOB: CTS CONTROL OF NEWSPEAK	JDC: 05388 REV. A PAGE 7 OF 10
SUBSYSTEM: Apollo Guidance Computer	ASSY:

NOTE: The following are the tests to be executed in order:

Test No.	Octal	Test Name	Reg Sel Register Display (If failure occurs)
1	01	ERASE MEM	0000 000 000 000 001
2	02	TS & TC	0000 000 000 000 010
3	03	CA, TS & AD	0000 000 000 000 011
4	04	CA & CCS	0000 000 000 000 100
5	05	TS OVERFLOW	0000 000 000 000 101
6	06	CCS LOOP	0000 000 000 000 110
7	07	AD LOOP 1	0000 000 000 000 111
8	10	AD LOOP 2	0000 000 000 001 000
9	11	LX CH	0000 000 000 001 001
10	12	XCH	0000 000 000 001 010
11	13	MASK	0000 000 000 001 011
12	14	CS	0000 000 000 001 100
13	15	NDX	0000 000 000 001 101
14	16	INCR	0000 000 000 001 110
15	17	DXCH	0000 000 000 001 111
16	20	DAS & ADS	0000 000 000 010 000
17	21	BZF	0000 000 000 010 001
18	22	BZMF	0000 000 000 010 010
19	23	DCA	0000 000 000 010 011
20	24	DCS	0000 000 000 010 100

DATE________

JOB: CTS CONTROL OF NEWSPEAK	JDC: 05388 REV. A PAGE 8 OF 10
SUBSYSTEM: Apollo Guidance Computer	ASSY:

Test No.	Octal	Test Name	Reg. Sel Register Display (If failure occurs)
21	25	MSU	0000 000 000 010 101
22	26	QXCH	0000 000 000 010 110
23	27	SU	0000 000 000 010 111
24	30	AUG	0000 000 000 011 000
25	31	DIM	0000 000 000 011 001
26	32	INDEX	0000 000 000 011 010
27	33	MP	0000 000 000 011 011
28	34	DIVIDE	0000 000 000 011 100
29	35	READ	0000 000 000 011 101
30	36	WRITE	0000 000 000 011 110
31	37	RAND	0000 000 000 011 111
32	40	WAND	0000 000 000 100 000
33	41	ROR	0000 000 000 100 001
34	42	WOR	0000 000 000 100 010
35	43	RXOR	0000 000 000 100 011
36	44	CHECK SUM	0000 000 000 100 100
37	45	T3 RUPT	0000 000 000 100 101
38	46	T4 RUPT	0000 000 000 100 110
39	47	EDRUPT	0000 000 000 100 111
40	50	NO RUPT	0000 000 000 101 000

DATE________

JOB: CTS CONTROL OF NEWSPEAK | JDC: 05388 REV: A PAGE 9 OF 10

SUBSYSTEM: Apollo Guidance Computer | ASSY:

Test No.	Octal	Test Name	Req Sel	Register Display (If failure occurs)
41	51	RUPTLOC	0000 000 000 101 001	
42	52	RELINT	0000 000 000 101 010	
43	53	PRIORITY (Simple)	0000 000 000 101 011	
44	54	BOD PARITY	0000 000 000 101 100	
45	55	ALL PARITY	0000 000 000 101 101	
46	56	INRUPT	0000 000 000 101 110	
47	57	TC TRAP	0000 000 000 101 111	
48	60	NIGHT WATCHMAN	0000 000 000 110 000	
49	61	SELF TEST	0000 000 000 110 001	
50	62	I/O START P	0000 000 000 110 010	
51	63	I/O STPIP	0000 000 000 110 011	
52	64	I/O TEST IV	0000 000 000 110 100	
53	65	I/O TEST 2V	0000 000 000 110 101	
54	66	I/O TEST 3V	0000 000 000 110 110	
55	67	I/O TEST 4V	0000 000 000 110 111	
56	70	I/O TEST 5V	0000 000 000 111 000	
57	71	I/O TEST 6V	0000 000 000 111 001	
58	72	SPECIAL ROPE	0000 000 000 111 010	
59	73	REG 20-23 + NDX GENERATION	0000 000 000 111 011	
60	74	DSKY INDICATORS	0000 000 000 111 100	

DATE________

JOB: CTS CONTROL OF NEWSPEAK | JDC: 05388 REV: A PAGE 10 OF 10

SUBSYSTEM: Apollo Guidance Control | ASSY:

B. PROCEDURE (Cont)

82. Verify that REG SEL register indicates:1111 000 111 000 111, on steady for five seconds, flashing for five seconds, and on steady for five seconds. (after approximately 4 min.)

NOTE: To terminate the program perform the following steps:

a. Allow two 15 second display cycles, during flashing portion of third cycle set the ALGA switch to OFF.

b. Set INHIBIT INTERRUPTS, T12, and INHIBIT INCREMENTS, switches to ON.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05388.IDC
REV. A
INITIAL TDRR 32541

JOB: CTS CONTROL OF NEWSPEAK

ASSEMBLY UNDER TEST	TEST HISTORY
TITLE Apollo Guidance Computer	DATE ____ START ____ END ____ SITE/LOCATION
SER. NO. ____ DWG. ____ REV. ____	TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE ____
NAME ____ SER. NO. ____ CAL DATE ____

CONDUCTED BY ____ NAME/AFFILIATION
APPROVED BY ____ NAME/AFFILIATION

B. PROCEDURE

	Results	Limits
1. Steps 1 thru 82 performed with no indication of failure	____	Testman's Stamp

DATE ____

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 REV: B PAGE 1 OF 10
INITIAL TDRR 32541 D.S PGS. 1

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

Tests instructions, erasable memory, checks sum of program modules, special rope modules, interrupts and alarms, and input-output, and DSKYs (tests 1-60). These tests are run on the CTS and all fail and success patterns displayed on the CTS are described in this JDC.

Rev. Let	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	4-13-67	33584	1, 10	1	[illegible]	[illegible]
B	6-30-67	34025	1,2,4	—	[illegible]	[illegible]

REFERENCES:
PS 2016007
PS 2016015

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Assure cable W263 is properly connected.
2. Assure that all Ropes are installed in their proper positions.
3. Assure that all RDC Interface Panel switches are OFF.
4. Press CH30-15 and CH33-10 to ON.
5. Assure PARITY FAIL switch is OFF.
6. Set Register Select switch to A.
7. Set the ALGA switch to OFF.
8. Press MONITOR.
9. Set INHIBIT INTERRUPTS, INHIBIT INCREMENT, and T12 switches to ON.

DATE________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 REV: B PAGE 2 OF 10

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE

1. Press FRESH START, PROCEED, and ALARM RESET.
2. Press KEYBOARD LOAD and CL.
3. Press keys in the following order: 00067 77777.
4. Press EXECUTE and CL.
5. Press keys in the following order: 00076 77777.
6. Press EXECUTE and CL.
7. Press keys in the following order: 00077 77777.
8. Press EXECUTE and CL.
9. Press keys in the following order: 00100 77777.
10. Press EXECUTE and CL.
11. Press keys in the following order: 00101 77777.
12. Press EXECUTE and CL.
13. Press keys in the following order: 00102 00003.
14. Press EXECUTE and CL.

15 (a). If using B1 Rope with PN 2003960-091 or 2003972-121, press keys in the following order: 00103 00771.
(b) If using B1 Rope with PN 2003972-221, press keys in the following order: 00103-00624.

16. Press EXECUTE and CL.

17 (a). If using B1 Rope with PN 2003960-091 or 2003972-121, press keys in the following order: 00104 31574.
(b). If using B1 Rope with PN 2003972-221, press keys in the following order: 00104 21102

18. Press EXECUTE and CL.
19. Press keys in the following order: 00105 00612.
20. Press EXECUTE and CL.

DATE________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 REV: B PAGE 3 OF 10

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (cont'd)

21. Press keys in the following order: 00106 13606.
22. Press EXECUTE and CL.
23. Press keys in the following order: 00117 00001.
24. Press EXECUTE and CL.
25. Press keys in the following order: 00120 77700.
26. Press EXECUTE, READ AGC, and CL.
27. Press keys in the following order: 0067.
28. Press EXECUTE.
29. Verify that the REG SEL register indicates: 1111 111 111 111 111.
30. Press CL.
31. Press keys in the following order: 0076.
32. Press EXECUTE.
33. Verify that the REG SEL registerindicates: 1111 111 111 111 111.
34. Press CL.
35. Press keys in the following order: 0077.
36. Press EXECUTE.
37. Verify that the REG SEL register indicates: 1111 111 111 111 111.
38. Press CL.
39. Press keys in the following order: 0100.
40. Press EXECUTE.

DATE________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 REV: B PAGE 4 OF 10

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

41. Verify that the REG SEL register indicates: 1111 111 111 111 111.
42. Press CL.
43. Press keys in the following order: 0101.
44. Press EXECUTE.
45. Verify that the REG SEL register indicates: 111 111 111 111 111.
46. Press CL.
47. Press keys in the following order: 0102.
48. Press EXECUTE.
49. Verify that the REG SEL register indicates: 0000 000 000 000 011.
50. Press CL.
51. Press keys in the following order: 0103.
52. Press EXECUTE.

53 (a). If using B1 Rope with PN 2003960-091 or 2003972-121, verify that the REG SEL register indicates: 0000 000 111 111 001.
(b). If using B1 Rope with PN 2003972-221, verify that REG SEL register indicates: 0000 000 110 010 100.

54. Press CL.
55. Press keys in the following order: 0104.
56. Press EXECUTE.

57 (a). If using B1 Rope with PN 2003960-091 or 2003972-121, verify that the REG SEL register indicates: 0011 001 101 111 100..
(b). If using B1 Rope with PN 2003972-221, verify that REG SEL register indicates: 0010 001 001 000 010.

58. Press CL.
59. Press keys in the following order: 0105.
60. Press EXECUTE.

DATE________

B. PROCEDURE

61. Verify that the REG SEL register indicates: 0000 000 110 001 010.
62. Press CL.
63. Press keys in the following order: 0106.
64. Press EXECUTE.
65. Verify that the REG SEL register indicates: 0001 011 110 000 110.
66. Press CL.
67. Press keys in the following order: 0117.
68. Press EXECUTE.
69. Verify that the REG SEL register indicates: 0000 000 000 000 001.
70. Press CL.
71. Press keys in the following order: 0120.
72. Press EXECUTE.
73. Verify that the REG SEL register indicates: 1111 111 111 000 000.
74. Press TRANSFER CONTROL AND CL.
75. Press keys in the following order: 4463.
76. Press EXECUTE and MONITOR.
77. Set T12, Inhibit Increments, and Inhibit Interrupt switches to OFF.
78. Press PROCEED.
79. Set ALGA to ON.

NOTE: If the subsystem contains two (2) DSKY's perform steps 80 and 81 with both DSKY's.

DATE________

B. PROCEDURE (cont'd)

80. Verify the following DSKY displays:
    - a. displays blank except RESTART indicator is ON.
    - b. all 9's, + signs, VERB and NOUN numbers and KEY REL and OPR ERR alarms flashing; remaining alarms and COMP ACTY indicator ON steady.
    - c. all 8's, - signs, RESTART indicator ON.
    - d. all 7's
    - e. all 6's
    - f. all 5's
    - g. all 4's
    - h. all 3's
    - i. all 2's
    - j. all 1's
    - k. all 0's
    - l. all positions blank

81. Verify the following DSKY displays:

REG1	70707
REG3	number of failures since start of JDC
VERB	00
NOUN	74
MODE	74
REG2	number represents the times thru one complete loop.

DATE________

NOTE: The following are the tests to be executed in order:

Test No.	Octal	Test Name	Reg Sel Register Display (If failure occurs)
1	01	ERASE MEM	0000 000 000 000 001
2	02	TS & TC	0000 000 000 000 010
3	03	CA, TS & AD	0000 000 000 000 011
4	04	CA & CCS	0000 000 000 000 100
5	05	TS OVERFLOW	0000 000 000 000 101
6	06	CCS LOOP	0000 000 000 000 110
7	07	AD LOOP 1	0000 000 000 000 111
8	10	AD LOOP 2	0000 000 000 001 000
9	11	LX CH	0000 000 000 001 001
10	12	XCH	0000 000 000 001 010
11	13	MASK	0000 000 000 001 011
12	14	CS	0000 000 000 001 100
13	15	NDX	0000 000 000 001 101
14	16	INCR	0000 000 000 001 110
15	17	DXCH	0000 000 000 001 111
16	20	DAS & ADS	0000 000 000 010 000
17	21	BZF	0000 000 000 010 001
18	22	BZMF	0000 000 000 010 010
19	23	DCA	0000 000 000 010 011
20	24	DCS	0000 000 000 010 100

DATE________

Test No.	Octal	Test Name	Reg. Sel Register Display (If failure occurs)
21	25	MSU	0000 000 000 010 101
22	26	QXCH	0000 000 000 010 110
23	27	SU	0000 000 000 010 111
24	30	AUG	0000 000 000 011 000
25	31	DIM	0000 000 000 011 001
26	32	INDEX	0000 000 000 011 010
27	33	MP	0000 000 000 011 011
28	34	DIVIDE	0000 000 000 011 100
29	35	READ	0000 000 000 011 101
30	36	WRITE	0000 000 000 011 110
31	37	RAND	0000 000 000 011 111
32	40	WAND	0000 000 000 100 000
33	41	ROR	0000 000 000 100 001
34	42	WOR	0000 000 000 100 010
35	43	RXOR	0000 000 000 100 011
36	44	CHECK SUM	0000 000 000 100 100
37	45	T3 RUPT	0000 000 000 100 101
38	46	T4 RUPT	0000 000 000 100 110
39	47	EDRUPT	0000 000 000 100 111
40	50	NO RUPT	0000 000 000 101 000

DATE________

JOB: CTS CONTROL OF NEWSPEAK | JDC: 05388 REV: B PAGE 9 OF 10
SUBSYSTEM: Apollo Guidance Computer | ASSY:

Test No.	Octal	Test Name	Reg Sel	Register Display (If failure occurs)
41	51	RUPTLOC	0000 000 000 101 001	
42	52	RELINT	0000 000 000 101 010	
43	53	PRIORITY (Simple)	0000 000 000 101 011	
44	54	BOD PARITY	0000 000 000 101 100	
45	55	ALL PARITY	0000 000 000 101 101	
46	56	INRUPT	0000 000 000 101 110	
47	57	TC TRAP	0000 000 000 101 111	
48	60	NIGHT WATCHMAN	0000 000 000 110 000	
49	61	SELF TEST	0000 000 000 110 001	
50	62	I/O START P	0000 000 000 110 010	
51	63	I/O STPIP	0000 000 000 110 011	
52	64	I/O TEST IV	0000 000 000 110 100	
53	65	I/O TEST 2V	0000 000 000 110 101	
54	66	I/O TEST 3V	0000 000 000 110 110	
55	67	I/O TEST 4V	0000 000 000 110 111	
56	70	I/O TEST 5V	0000 000 000 111 000	
57	71	I/O TEST 6V	0000 000 000 111 001	
58	72	SPECIAL ROPE	0000 000 000 111 010	
59	73	REG 20-23 + NDX GENERATION	0000 000 000 111 011	
60	74	DSKY INDICATORS	0000 000 000 111 100	

DATE_________

JOB: CTS CONTROL OF NEWSPEAK | JDC: 05388 REV: B PAGE 10 OF 10
SUBSYSTEM: Apollo Guidance Control | ASSY:

B. PROCEDURE (Cont)

82. Verify that REG SEL register indicates:1111 000 111 000 111, on steady for five seconds, flashing for five seconds, and on steady for five seconds. (after approximately 4 min.)

NOTE: To terminate the program perform the following steps:

a. Allow two 15 second display cycles, during flashing portion of third cycle set the ALGA switch to OFF.

b. Set INHIBIT INTERRUPTS, T12, and INHIBIT INCREMENTS, switches to ON.

DATE_________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05388.IDC
REV. B
INITIAL TDRR 32541

JOB: CTS CONTROL OF NEWSPEAK

ASSEMBLY UNDER TEST	**TEST HISTORY**
TITLE Apollo Guidance Computer	DATE ___ START ___ END ___ SITE/LOCATION
SER. NO. ___ DWG. ___ REV. ___	TIME ___ START ___ END ___ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ___ SER. NO. ___ CAL DATE
NAME ___ SER. NO. ___ CAL DATE

CONDUCTED BY ___ NAME/AFFILIATION APPROVED BY ___ NAME/AFFILIATION

B. PROCEDURE

	Results	Limits
1. Steps 1 thru 82 performed with no indication of failure	____	Testman's Stamp

DATE ____

JOB: CTS CONTROL OF NEWSPEAK	**JDC:** 05388 **REV:** C **PAGE** 1 **OF** 10
	INITIAL TDRR 32541 **D.S. PGS.** 1
SUBSYSTEM: Apollo Guidance Computer	**ASSY:**

DESCRIPTION:

Tests instructions, erasable memory, checks sum of program modules, special rope modules, interrupts and alarms, and input-output, and DSKYs (tests 1-60). These tests are run on the CTS and all fail and success patterns displayed on the CTS are described in this JDC.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	4-13-67	33584	1, 10	1	[illegible]	[illegible]
B	6-30-67	34025	1,2,4	—	[illegible]	[illegible]
C	10-30-67	34974	1, 2	—	EC FA	EC FA

REFERENCES:
PS 2016007
PS 2016015

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Assure cable W263 is properly connected.
2. Assure that all Ropes are installed in their proper positions.
3. Assure that all RDC Interface Panel switches are OFF.
4. Press CH30-15 and CH33-10 to ON.
5. Assure PARITY FAIL switch is OFF.
6. Set Register Select switch to A.
7. Set the ALGA switch to OFF.
8. Press MONITOR.
9. Set INHIBIT INTERRUPTS, INHIBIT INCREMENT, and T12 switches to OFF.

DATE________

JOB: CTS CONTROL OF NEWSPEAK	**JDC:** 05388 **REV:** C **PAGE** 2 **OF** 10
SUBSYSTEM: Apollo Guidance Computer	**ASSY:**

B. PROCEDURE

1. Press FRESH START, PROCEED, and ALARM RESET. Set INHIBIT INTERRUPTS, INHIBIT INCREMENTS, and T12 switches to ON.
2. Press KEYBOARD LOAD and CL.
3. Press keys in the following order: 00067 77777.
4. Press EXECUTE and CL.
5. Press keys in the following order: 00076 77777.
6. Press EXECUTE and CL.
7. Press keys in the following order: 00077 77777.
8. Press EXECUTE and CL.
9. Press keys in the following order: 00100 77777.
10. Press EXECUTE and CL.
11. Press keys in the following order: 00101 77777.
12. Press EXECUTE and CL.
13. Press keys in the following order: 00102 00003.
14. Press EXECUTE and CL.

15 (a). If using B1 Rope with PN 2003960-091 or 2003972-121, press keys in the following order: 00103 00771.
(b) If using B1 Rope with PN 2003972-221, press keys in the following order: 00103-00624.

16. Press EXECUTE and CL.

17 (a). If using B1 Rope with PN 2003960-091 or 2003972-121, press keys in the following order: 00104 31574.
(b). If using B1 Rope with PN 2003972-221, press keys in the following order: 00104 21102.

18. Press EXECUTE and CL.
19. Press keys in the following order: 00105 00612.
20. Press EXECUTE and CL.

DATE________

JOB: CTS CONTROL OF NEWSPEAK	**JDC:** 05388 **REV:** C **PAGE** 3 **OF** 10
SUBSYSTEM: Apollo Guidance Computer	**ASSY:**

B. PROCEDURE (cont'd)

21. Press keys in the following order: 00106 13606.
22. Press EXECUTE and CL.
23. Press keys in the following order: 00117 00001.
24. Press EXECUTE and CL.
25. Press keys in the following order: 00120 77700.
26. Press EXECUTE, READ AGC, and CL.
27. Press keys in the following order: 0067.
28. Press EXECUTE.
29. Verify that the REG SEL register indicates: 1111 111 111 111 111.
30. Press CL.
31. Press keys in the following order: 0076.
32. Press EXECUTE.
33. Verify that the REG SEL registerindicates: 1111 111 111 111 111.
34. Press CL.
35. Press keys in the following order: 0077.
36. Press EXECUTE.
37. Verify that the REG SEL register indicates: 1111 111 111 111 111.
38. Press CL.
39. Press keys in the following order: 0100.
40. Press EXECUTE.

DATE________

JOB: CTS CONTROL OF NEWSPEAK	**JDC:** 05388 **REV:** C **PAGE** 4 **OF** 10
SUBSYSTEM: Apollo Guidance Computer	**ASSY:**

B. PROCEDURE (Cont'd)

41. Verify that the REG SEL register indicates: 1111 111 111 111 111.
42. Press CL.
43. Press keys in the following order: 0101.
44. Press EXECUTE.
45. Verify that the REG SEL register indicates: 111 111 111 111 111.
46. Press CL.
47. Press keys in the following order: 0102.
48. Press EXECUTE.
49. Verify that the REG SEL register indicates: 0000 000 000 000 011.
50. Press CL.
51. Press keys in the following order: 0103.
52. Press EXECUTE.

53 (a). If using B1 Rope with PN 2003960-091 or 2003972-121, verify that the REG SEL register indicates: 0000 000 111 111 001.
(b). If using B1 Rope with PN 2003972-221, verify that REG SEL register indicates: 0000 000 110 010 100.

54. Press CL.
55. Press keys in the following order: 0104.
56. Press EXECUTE.

57 (a). If using B1 Rope with PN 2003960-091 or 2003972-121, verify that the REG SEL register indicates: 0011 001 101 111 100.
(b). If using B1 Rope with PN 2003972-221, verify that REG SEL register indicates: 0010 001 001 000 010.

58. Press CL.
59. Press keys in the following order: 0105.
60. Press EXECUTE.

DATE________

JOB: CTS CONTROL OF NEWSPEAK | JDC 05388 REV C PAGE 5 OF 10
SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE

61. Verify that the REG SEL register indicates: 0000 000 110 001 010.

62. Press CL.

63 Press keys in the following order: 0106.

64. Press EXECUTE.

65. Verify that the REG SEL register indicates: 0001 011 110 000 110.

66. Press CL.

67. Press keys in the following order: 0117.

68. Press EXECUTE.

69. Verify that the REG SELregister indicates: 0000 000 000 000 001.

70. Press CL.

71. Press keys in the following order: 0120.

72. Press EXECUTE.

73. Verify that the REG SEL register indicates: 1111 111 111 000 000.

74. Press TRANSFER CONTROL AND CL.

75. Press keys in the following order: 4463.

76. Press EXECUTE and MONITOR.

77. Set T12, Inhibit Increments, and Inhibit Interrupt switches to OFF.

78. Press PROCEED.

79. Set ALGA to ON.

NOTE: If the subsystem contains two (2) DSKY's perform steps 80 and 81 with both DSKY's.

DATE________

JOB: CTS CONTROL OF NEWSPEAK | JDC: 05388 REV C PAGE 6 OF 10
SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (cont'd)

80. Verify the following DSKY displays:

a. displays blank except RESTART indicator is ON.

b. all 9's, + signs, VERB and NOUN numbers and KEY REL and OPR ERR alarms flashing; remaining alarms and COMP ACTY indicator ON steady.

c. all 8's, - signs, RESTART indicator ON.

d. all 7's

e. all 6's

f. all 5's

g. all 4's

h. all 3's

i. all 2's

j. all 1's

k. all 0's

l. all positions blank

81. Verify the following DSKY displays:

REG1	70707
REG3	number of failures since start of JDC
VERB	00
NOUN	74
MODE	74
REG2	number represents the times thru one complete loop.

DATE________

JOB: CTS CONTROL OF NEWSPEAK | JDC 05388 REV C PAGE 7 OF 10
SUBSYSTEM: Apollo Guidance Computer | ASSY:

NOTE: The following are the tests to be executed in order:

Test No.	Octal	Test Name	Reg Sel Register Display (If failure occurs)
1	01	ERASE MEM	0000 000 000 000 001
2	02	TS & TC	0000 000 000 000 010
3	03	CA, TS & AD	0000 000 000 000 011
4	04	CA & CCS	0000 000 000 000 100
5	05	TS OVERFLOW	0000 000 000 000 101
6	06	CCS LOOP	0000 000 000 000 110
7	07	AD LOOP 1	0000 000 000 000 111
8	10	AD LOOP 2	0000 000 000 001 000
9	11	LX CH	0000 000 000 001 001
10	12	XCH	0000 000 000 001 010
11	13	MASK	0000 000 000 001 011
12	14	CS	0000 000 000 001 100
13	15	NDX	0000 000 000 001 101
14	16	INCR	0000 000 000 001 110
15	17	DXCH	0000 000 000 001 111
16	20	DAS & ADS	0000 000 000 010 000
17	21	BZF	0000 000 000 010 001
18	22	BZMF	0000 000 000 010 010
19	23	DCA	0000 000 000 010 011
20	24	DCS	0000 000 000 010 100

DATE________

JOB: CTS CONTROL OF NEWSPEAK | JDC: 05388 REV C PAGE 8 OF 10
SUBSYSTEM: Apollo Guidance Computer | ASSY:

Test No.	Octal	Test Name	Reg. Sel Register Display (If failure occurs)
21	25	MSU	0000 000 000 010 101
22	26	QXCH	0000 000 000 010 110
23	27	SU	0000 000 000 010 111
24	30	AUG	0000 000 000 011 000
25	31	DIM	0000 000 000 011 001
26	32	INDEX	0000 000 000 011 010
27	33	MP	0000 000 000 011 011
28	34	DIVIDE	0000 000 000 011 100
29	35	READ	0000 000 000 011 101
30	36	WRITE	0000 000 000 011 110
31	37	RAND	0000 000 000 011 111
32	40	WAND	0000 000 000 100 000
33	41	ROR	0000 000 000 100 001
34	42	WOR	0000 000 000 100 010
35	43	RXOR	0000 000 000 100 011
36	44	CHECK SUM	0000 000 000 100 100
37	45	T3 RUPT	0000 000 000 100 101
38	46	T4 RUPT	0000 000 000 100 110
39	47	EDRUPT	0000 000 000 100 111
40	50	NO RUPT	0000 000 000 101 000

DATE________

JOB: CTS CONTROL OF NEWSPEAK | **JDC:** 05388 **REV** 1 C **PAGE** 9 **OF** 10

SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

Test No.	Octal	Test Name	Req Sel	Register Display (If failure occurs)
41	51	RUPTLOC	0000 000 000 101 001	
42	52	RELINT	0000 000 000 101 010	
43	53	PRIORITY (Simple)	0000 000 000 101 011	
44	54	BOD PARITY	0000 000 000 101 100	
45	55	ALL PARITY	0000 000 000 101 101	
46	56	INRUPT	0000 000 000 101 110	
47	57	TC TRAP	0000 000 000 101 111	
48	60	NIGHT WATCHMAN	0000 000 000 110 000	
49	61	SELF TEST	0000 000 000 110 001	
50	62	I/O START P	0000 000 000 110 010	
51	63	I/O STEIP	0000 000 000 110 011	
52	64	I/O TEST IV	0000 000 000 110 100	
53	65	I/O TEST 2V	0000 000 000 110 101	
54	66	I/O TEST 3V	0000 000 000 110 110	
55	67	I/O TEST 4V	0000 000 000 110 111	
56	70	I/O TEST 5V	0000 000 000 111 000	
57	71	I/O TEST 6V	0000 000 000 111 001	
58	72	SPECIAL ROPE	0000 000 000 111 010	
59	73	REG 20-23 + NDX GENERATION	0000 000 000 111 011	
60	74	DSKY INDICATORS	0000 000 000 111 100	

DATE________

JOB: CTS CONTROL OF NEWSPEAK | **JDC:** 05388 **REV:** B **PAGE** 10 **OF** 10

SUBSYSTEM: Apollo Guidance Control | **ASSY:**

B. PROCEDURE (Cont)

82. Verify that REG SEL register indicates:1111 000 111 000 111, on steady for five seconds, flashing for five seconds, and on steady for five seconds. (after approximately 4 min.)

NOTE: To terminate the program perform the following steps:

a. Allow two 15 second display cycles, during flashing portion of third cycle set the ALGA switch to OFF.

b. Set INHIBIT INTERRUPTS, T12, and INHIBIT INCREMENTS, switches to ON.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05388.10C
REV. C
INITIAL TDRR 32541

JOB: CTS CONTROL OF NEWSPEAK

ASSEMBLY UNDER TEST

TITLE Apollo Guidance Computer

SER. NO. ______ DWG. ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE/LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE ______

NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

B. PROCEDURE

	Results	Limits
1. Steps 1 thru 82 performed with no indication of failure	______	Testman's Stamp

DATE ______

JOB: CTS CONTROL OF NEWSPEAK
JDC: 05388 REV: D PAGE 1 OF 16
INITIAL TDRR 32541 D.S PGS 1

SUBSYSTEM: Apollo Guidance Computer
ASSY:

DESCRIPTION:

Tests instructions, erasable memory, checks sum of program modules, special rope modules, interrupts and alarms, and input-output, and DSKYs (tests 1-60). These tests are run on the CTS and all fail and success patterns displayed on the CTS are described in this JDC.

Rev. Let	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	4-13-67	33584	1, 10	1	[illegible]	[illegible]
B	6-30-67	34025	1,2,4	—	[illegible]	[illegible]
C	10-30-67	34974	1, 2	—	[illegible]	[illegible]
D	4/11/68	36071	ALL	1	[illegible]	[illegible]

REFERENCES:
PS 2016007
PS 2016015

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Assure cable W263 is properly connected.
2. Assure that all Ropes are installed in their proper positions.
3. Assure that all RDC Interface Panel switches are OFF.
4. Press CH30-15 and CH33-10 to ON.
5. Assure PARITY FAIL switch is OFF.
6. Set Register Select switch to A.
7. Set the ALGA switch to OFF.
8. Press MONITOR.
9. Set INHIBIT INTERRUPTS, INHIBIT INCREMENT, and T12 switches to OFF.

NOTE: Perform Part B "Procedure for NEWSPEAK/TWOSPEAK or Part C "Procedure for LAMESH" as applicable. Do not perform both Parts B and C.

DATE ________

JOB: CTS CONTROL OF NEWSPEAK
JDC: 05388 REV: D PAGE 2 OF 16

SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE FOR NEWSPEAK/TWOSPEAK

1. Press FRESH START, PROCEED, and ALARM RESET. Set INHIBIT INTERRUPTS, INHIBIT INCREMENTS, and T12 switches to ON.
2. Press KEYBOARD LOAD and CL.
3. Press keys in the following order: 00067 77777.
4. Press EXECUTE and CL.
5. Press keys in the following order: 00076 77777.
6. Press EXECUTE and CL.
7. Press keys in the following order: 00077 77777.
8. Press EXECUTE and CL.
9. Press keys in the following order: 00100 77777.
10. Press EXECUTE and CL.
11. Press keys in the following order: 00101 77777.
12. Press EXECUTE and CL.
13. Press keys in the following order: 00102 00003.
14. Press EXECUTE and CL.

15 (a). If using B1 Rope with PN 2003960-091 or 2003972-121, press keys in the following order: 00103 00771.
(b) If using B1 Rope with PN 2003972-221, press keys in the following order: 00103-00624.

16. Press EXECUTE and CL.

17 (a). If using B1 Rope with PN 2003960-091 or 2003972-121, press keys in the following order: 00104 31574.
(b). If using B1 Rope with PN 2003972-221, press keys in the following order: 00104 21102.

18. Press EXECUTE and CL.
19. Press keys in the following order: 00105 00612.
20. Press EXECUTE and CL.

DATE ________

JOB: CTS CONTROL OF NEWSPEAK
JDC: 05388 REV: D PAGE 3 OF 16

SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (cont'd)

21. Press keys in the following order: 00106 13606.
22. Press EXECUTE and CL.
23. Press keys in the following order: 00117 00001.
24. Press EXECUTE and CL.
25. Press keys in the following order: 00120 77700.
26. Press EXECUTE, READ AGC, and CL.
27. Press keys in the following order: 0067.
28. Press EXECUTE.
29. Verify that the REG SEL register indicates: 1111 111 111 111 111.
30. Press CL.
31. Press keys in the following order: 0076.
32. Press EXECUTE.
33. Verify that the REG SEL registerindicates: 1111 111 111 111 111.
34. Press CL.
35. Press keys in the following order: 0077.
36. Press EXECUTE.
37. Verify that the REG SEL register indicates: 1111 111 111 111 111.
38. Press CL.
39. Press keys in the following order: 0100.
40. Press EXECUTE.

DATE ________

JOB: CTS CONTROL OF NEWSPEAK
JDC: 05388 REV D PAGE 4 OF 16

SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (Cont'd)

41. Verify that the REG SEL register indicates: 1111 111 111 111 111.
42. Press CL.
43. Press keys in the following order: 0101.
44. Press EXECUTE.
45. Verify that the REG SEL register indicates: 111 111 111 111 111.
46. Press CL.
47. Press keys in the following order: 0102.
48. Press EXECUTE.
49. Verify that the REG SEL register indicates: 0000 000 000 000 011.
50. Press CL.
51. Press keys in the following order: 0103.
52. Press EXECUTE.

53 (a). If using B1 Rope with PN 2003960-091 or 2003972-121, verify that the REG SEL register indicates: 0000 000 111 111 001.
(b). If using B1 Rope with PN 2003972-221, verify that REG SEL register indicates: 0000 000 110 010 100.

54. Press CL.
55. Press keys in the following order: 0104.
56. Press EXECUTE.

57 (a). If using B1 Rope with PN 2003960-091 or 2003972-121, verify that the REG SEL register indicates: 0011 001 101 111 100..
(b). If using B1 Rope with PN 2003972-221, verify that REG SEL register indicates: 0010 001 001 000 010.

58. Press CL.
59. Press keys in the following order: 0105.
60. Press EXECUTE.

DATE ________

B. PROCEDURE

61. Verify that the REG SEL register indicates: 0000 000 110 001 010.
62. Press CL.
63 Press keys in the following order: 0106.
64. Press EXECUTE.
65. Verify that the REG SEL register indicates: 0001 011 110 000 110.
66. Press CL.
67. Press keys in the following order: 0117.
68. Press EXECUTE.
69. Verify that the REG SELregister indicates: 0000 000 000 000 001.
70. Press CL.
71. Press keys in the following order: 0120.
72. Press EXECUTE.
73. Verify that the REG SEL register indicates: 1111 111 111 000 000.
74. Press TRANSFER CONTROL AND CL.
75. Press keys in the following order: 4463.
76. Press EXECUTE and MONITOR.
77. Set T12, Inhibit Increments, and Inhibit Interrupt switches to OFF.
78. Press PROCEED.
79. Set ALGA to ON.

NOTE: If the subsystem contains two (2) DSKY's perform steps 80 and 81 with both DSKY's.

DATE________

B. PROCEDURE (cont'd)

80. Verify the following DSKY displays:
    a. displays blank except RESTART indicator is ON.
    b. all 9's, + signs, VERB and NOUN numbers and KEY REL and OPR ERR alarms flashing; remaining alarms and COMP ACTY indicator ON steady.
    c. all 8's, - signs, RESTART indicator ON.
    d. all 7's
    e. all 6's
    f. all 5's
    g. all 4's
    h. all 3's
    i. all 2's
    j. all 1's
    k. all 0's
    l. all positions blank

81. Verify the following DSKY displays:

REG1	70707
REG3	number of failures since start of JDC
VERB	00
NOUN	74
MODE	74
REG2	number represents the times thru one complete loop.

DATE________

NOTE: The following are the tests to be executed in order:

Test No.	Octal	Test Name	Reg Sel Register Display(If failure occurs)
1	01	ERASE MEM	0000 000 000 000 001
2	02	TS & TC	0000 000 000 000 010
3	03	CA, TS & AD	0000 000 000 000 011
4	04	CA & CCS	0000 000 000 000 100
5	05	TS OVERFLOW	0000 000 000 000 101
6	06	CCS LOOP	0000 000 000 000 110
7	07	AD LOOP 1	0000 000 000 000 111
8	10	AD LOOP 2	0000 000 000 001 000
9	11	LX CH	0000 000 000 001 001
10	12	XCH	0000 000 000 001 010
11	13	MSK	0000 000 000 001 011
12	14	CS	0000 000 000 001 100
13	15	NDX	0000 000 000 001 101
14	16	INCR	0000 000 000 001 110
15	17	DXCH	0000 000 000 001 111
16	20	DAS & ADS	0000 000 000 010 000
17	21	BZF	0000 000 000 010 001
18	22	BZMF	0000 000 000 010 010
19	23	DCA	0000 000 000 010 011
20	24	DCS	0000 000 000 010 100

DATE________

Test No.	Octal	Test Name	Reg. Sel Register Display (If failure occurs)
21	25	MSU	0000 000 000 010 101
22	26	QXCH	0000 000 000 010 110
23	27	SU	0000 000 000 010 111
24	30	AUG	0000 000 000 011 000
25	31	DIM	0000 000 000 011 001
26	32	INDEX	0000 000 000 011 010
27	33	MP	0000 000 000 011 011
28	34	DIVIDE	0000 000 000 011 100
29	35	READ	0000 000 000 011 101
30	36	WRITE	0000 000 000 011 110
31	37	RAND	0000 000 000 011 111
32	40	WAND	0000 000 000 100 000
33	41	ROR	0000 000 000 100 001
34	42	WOR	0000 000 000 100 010
35	43	RXOR	0000 000 000 100 011
36	44	CHECK SUM	0000 000 000 100 100
37	45	T3 RUPT	0000 000 000 100 101
38	46	T4 RUPT	0000 000 000 100 110
39	47	EDRUPT	0000 000 000 100 111
40	50	NO RUPT	0000 000 000 101 000

DATE________

Test No.	Octal	Test Name	Reg Sel Register Display (If failure occurs)
41	51	RUPTLOC	0000 000 000 101 001
42	52	RELINT	0000 000 000 101 010
43	53	PRIORITY (Simple)	0000 000 000 101 011
44	54	BAD PARITY	0000 000 000 101 100
45	55	ALL PARITY	0000 000 000 101 101
46	56	INRUPT	0000 000 000 101 110
47	57	TC TRAP	0000 000 000 101 111
48	60	NIGHT WATCHMAN	0000 000 000 110 000
49	61	SELF TEST	0000 000 000 110 001
50	62	I/O START P	0000 000 000 110 010
51	63	I/O STPIP	0000 000 000 110 011
52	64	I/O TEST IV	0000 000 000 110 100
53	65	I/O TEST 2V	0000 000 000 110 101
54	66	I/O TEST 3V	0000 000 000 110 110
55	67	I/O TEST 4V	0000 000 000 110 111
56	70	I/O TEST 5V	0000 000 000 111 000
57	71	I/O TEST 6V	0000 000 000 111 001
58	72	SPECIAL ROPE	0000 000 000 111 010
59	73	REG 20-23 + NDX GENERATION	0000 000 000 111 011
60	74	DSKY INDICATORS	0000 000 000 111 100

DATE________

B. PROCEDURE (Cont'd)

82. Verify that REG SEL register indicates: 1111 000 111 000 111, on steady for five seconds, flashing for five seconds, and on steady for five seconds. (after approximately 4 min.)

NOTE: To terminate the program perform the following steps:

a. Allow two 15 second display cycles, during flashing portion of third cycle set the ALGA switch to OFF.

b. Set INHIBIT INTERRUPTS, T12, and INHIBIT INCREMENTS, switches to ON.

C. PROCEDURE FOR LAMESH

1. Set T12, INHIBIT INTERRUPT and INHIBIT INCREMENTS switches to OFF.

2. Set ALGA switch to OFF.

3. Press FRESH START, PROCEED, and ALARM RESET. Set INHIBIT INTERRUPT, INHIBIT INCREMENTS, and T12 switches to ON.

4. Set TAPE READER POWER to ON.

5. Press TAPE LOAD ANNUNCIATOR, TAPE FREE RUN and CL. Press ON INHIBIT BANK RESTORE switch.

6. Place LAMESH CONSTANTS TAPE on TAPE READER.

7. Press RESET and EXECUTE.

8. Rewind tape when complete tape is loaded.

9. Press TAPE VERIFY and CL.

DATE________

C. PROCEDURE (Cont'd)

10. Press RESET and EXECUTE.

11. After tape is verified, press TAPE FREE RUN switch OFF and INHIBIT BANK RESTORE OFF.

12. Press TRANSFER CONTROL, CL, 7545 and EXECUTE.

13. Press MONITOR.

14. Set INHIBIT INTERRUPT, INHIBIT INCREMENTS, and T12 to OFF.

15. Set RPTR switch ON.

16. Press PROCEED.

17. Set ALGA ON.

18. Verify that within 30 seconds DSKY displays are blank.

NOTE: Computer will cycle thru tests 1 thru 60.
Also verify that AGC ALARMS 1 thru 5, 7, 8, 12, and 15 thru 18 are OFF.

19. Verify the following DSKY displays:

a. displays blank

b. all 9's, + signs, VERB and NOUN numbers and KEY REL and OPR ERR alarms flashing; remaining alarms and COMP ACTY indicator ON steady.

c. all 8's, - signs

d. all 7's

e. all 6's

DATE________

C. PROCEDURE (Cont'd)

19. (Continued)

f. all 5's

g. all 4's

h. all 3's

i. all 2's

j. all 1's

k. all 0's

l. all positions blank

20. Verify the following DSKY displays:

REG1	70707
REG3	number of failures since start of JDC
VERB	00
NOUN	74
MODE	74
REG2	number represents the times thru one complete loop.

NOTE: The following are the tests to be executed in order:

Test No.	Octal	Test Name	Reg Sel Display (If failure occurs)
1	01	ERASE MEM	0000 000 000 000 001
2	02	TS & TC	0000 000 000 000 010
3	03	CA, TS & AD	0000 000 000 000 011
4	04	CA & CCS	0000 000 000 000 100

DATE________

JOB: CTS CONTROL OF NEWSPEAK | JDC: 05388 REV: D PAGE 13 OF 16
SUBSYSTEM: Apollo Guidance Computer | ASSY:

C. PROCEDURE (Cont'd)

20. (Continued)

Test No.	Octal	Test Name	Req Sel Display(If failure occurs)
5	05	TS OVERFLOW	0000 000 000 000 101
6	06	CCS LOOP	0000 000 000 000 110
7	07	AD LOOP 1	0000 000 000 000 111
8	10	AD LOOP 2	0000 000 000 001 000
9	11	LX CH	0000 000 000 001 001
10	12	MSK	0000 000 000 001 010
11	13	CS	0000 000 000 001 011
12	14	NDX	0000 000 000 001 100
13	15	INCR	0000 000 000 001 101
14	16	DXCH	0000 000 000 001 110
15	17	DAS & ADS	0000 000 000 001 111
16	20	BZF	0000 000 000 010 000
17	21	BZMF	0000 000 000 010 001
18	22	DCA	0000 000 000 010 010
19	23	DCS	0000 000 000 010 011
20	24	MSU	0000 000 000 010 100
21	25	OXCH	0000 000 000 010 101
22	26	SU	0000 000 000 010 110
23	27	AUG	0000 000 000 010 111
24	30	DIM	0000 000 000 011 000
25	31	INDEX	0000 000 000 011 001

DATE________

JOB: CTS CONTROL OF NEWSPEAK | JDC: 05388 REV: D PAGE 14 OF 16
SUBSYSTEM: Apollo Guidance Computer | ASSY:

C. PROCEDURE (Cont'd)

20. (Continued)

Test No.	Octal	Test Name	Req Sel Display(If failure occurs)
26	32	MP	0000 000 000 011 010
27	33	DIVIDE	0000 000 000 011 011
28	34	READ	0000 000 000 011 100
29	35	WRITE	0000 000 000 011 101
30	36	RAND	0000 000 000 011 110
31	37	WAND	0000 000 000 011 111
32	40	ROR	0000 000 000 100 000
33	41	WOR	0000 000 000 100 001
34	42	RXOR	0000 000 000 100 010
35	43	CHECK SUM	0000 000 000 100 011
36	44	T3 RUPT	0000 000 000 100 100
37	45	T4 RUPT	0000 000 000 100 101
38	46	EDRUPT	0000 000 000 100 110
39	47	NO RUPT	0000 000 000 100 111
40	50	RUPTLOC	0000 000 000 101 000
41	51	RELINT	0000 000 000 101 001
42	52	PRIORITY (Simple)	0000 000 000 101 010
43	53	BAD PARITY	0000 000 000 101 011
44	54	ALL PARITY	0000 000 000 101 100

DATE________

JOB: CTS CONTROL OF NEWSPEAK | JDC: 05388 REV: D PAGE 15 OF 16
SUBSYSTEM: Apollo Guidance Computer | ASSY:

C. PROCEDURE (Cont'd)

20. (Continued)

Test No.	Octal	Test Name	Req Sel Display(If failure occurs)
45	55	INRUPT	0000 000 000 101 101
46	56	TC TRAP	0000 000 000 101 110
47	57	NIGHT WATCHMAN	0000 000 000 101 111
48	60	SELF TEST	0000 000 000 110 000
49	61	I/O START P	0000 000 000 110 001
50	62	I/O STPIP	0000 000 000 110 010
51	63	I/O TEST 1V	0000 000 000 110 011
52	64	I/O TEST 2V	0000 000 000 110 100
53	65	I/O TEST 3V	0000 000 000 110 101
54	66	I/O TEST 4V	0000 000 000 110 110
55	67	I/O TEST 5V	0000 000 000 110 111
56	70	I/O TEST 6V	0000 000 000 111 000
57	71	SPECIAL ROPE	0000 000 000 111 001
58	72	REG 20-23 +NDX GENERATION	0000 000 000 111 010
59	73	DSKY INDICATORS	0000 000 000 111 011
60	74	E MEMORY	0000 000 000 111 100

DATE________

JOB: CTS CONTROL OF NEWSPEAK | JDC: 05388 REV: D PAGE 16 OF 16
SUBSYSTEM: Apollo Guidance Computer | ASSY:

C. PROCEDURE (Cont'd)

21. Verify that REG SEL register indicates: 1111 000 111 000 111, on steady for five seconds, flashing for five seconds, and on steady for five seconds. (after approximately 4 min.)

NOTE: To terminate the program perform the following steps:

a. Allow two 15 second display cycles, during flashing portion of third cycle set the ALGA switch to OFF.

b. Set INHIBIT INTERRUPT, T12, and INHIBIT INCREMENTS, switches to ON. Set RPTR switch to OFF.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05388.IOC
REV. D
INITIAL TDRR 31541

JOB: CTS CONTROL OF NEWSPEAK

ASSEMBLY UNDER TEST

TITLE Apollo Guidance Computer
SER. NO. _____ DWG. _____ REV. _____

TEST HISTORY

DATE _____ (START) _____ (END) _____ (SITE/LOCATION)
TIME _____ (START) _____ (END) _____ (TOTAL ELAPSED)

MAJOR GROUND SUPPORT EQUIPMENT

NAME _____ SER. NO. _____ CAL DATE _____
NAME _____ SER. NO. _____ CAL DATE _____

CONDUCTED BY _____ (NAME/AFFILIATION) APPROVED BY _____ (NAME/AFFILIATION)

B. PROCEDURE FOR NEWSPEAK/TWOSPEAK

	Results	Limits
1. Steps 1 thru 82 performed with no indication of failure	_____	Testman's Stamp

C. PROCEDURE FOR LAMESH

	Results	Limits
1. Steps 1 thru 21 performed with no indications of failure	_____	Testman's Stamp

DATE _____

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 **REV:** - **PAGE** 1 **OF** 10

INITIAL TDRR 32541 **D.S. PGS.** 1

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

Tests instructions, erasable memory, checks sum of program modules, special rope modules, interrupts and alarms, and input-output, and DSKYs (tests 1-60). These tests are run on the CTS and all fail and success patterns displayed on the CTS are described in this JDC.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES:

PS 2016007

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Assure cable W263 is properly connected.
2. Assure that all Ropes are installed in their proper positions.
3. Assure that all RDC Interface Panel switches are OFF.
4. Press CH30-15 and CH33-10 to ON.
5. Assure PARITY FAIL switch is OFF.
6. Set Register Select switch to A.
7. Set the ALGA switch to OFF.
8. Press MONITOR.
9. Set INHIBIT INTERRUPTS, INHIBIT INCREMENT, and T12 switches to ON.

DATE ________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 **REV:** - **PAGE** 2 **OF** 10

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE

1. Press FRESH START, PROCEED, and ALARM RESET.
2. Press KEYBOARD LOAD and CL.
3. Press keys in the following order: 00067 77777.
4. Press EXECUTE and CL.
5. Press keys in the following order: 00076 77777.
6. Press EXECUTE and CL.
7. Press keys in the following order: 00077 77777.
8. Press EXECUTE and CL.
9. Press keys in the following order: 00100 77777.
10. Press EXECUTE and CL.
11. Press keys in the following order: 00101 77777.
12. Press EXECUTE and CL.
13. Press keys in the following order: 00102 00003.
14. Press EXECUTE and CL.
15. Press keys in the following order: 00103 00771.
16. Press EXECUTE and CL.
17. Press keys in the following order: 00104 31574.
18. Press EXECUTE and CL.
19. Press keys in the following order: 00105 00612.
20. Press EXECUTE and CL.

DATE ________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 **REV:** - **PAGE** 3 **OF** 10

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (cont'd)

21. Press keys in the following order: 00106 13606.
22. Press EXECUTE and CL.
23. Press keys in the following order: 00117 00001.
24. Press EXECUTE and CL.
25. Press keys in the following order: 00120 77700.
26. Press EXECUTE, READ AGC, and CL.
27. Press keys in the following order: 0067.
28. Press EXECUTE.
29. Verify that the REG SEL register indicates: 1111 111 111 111 111.
30. Press CL.
31. Press keys in the following order: 0076.
32. Press EXECUTE.
33. Verify that the REG SEL registerindicates: 1111 111 111 111 111.
34. Press CL.
35. Press keys in the following order: 0077.
36. Press EXECUTE.
37. Verify that the REG SEL register indicates: 1111 111 111 111 111.
38. Press CL.
39. Press keys in the following order: 0100.
40. Press EXECUTE.

DATE ________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 **REV:** - **PAGE** 4 **OF** 10

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (cont'd)

41. Verify that the REG SEL register indicates: 1111 111 111 111 111.
42. Press CL.
43. Press keys in the following order: 0101.
44. Press EXECUTE.
45. Verify that the REG SEL register indicates: 1111 111 111 111 111.
46. Press CL.
47. Press keys in the following order: 0102.
48. Press EXECUTE.
49. Verify that the REG SEL register indicates: 0000 000 000 000 011.
50. Press CL.
51. Press keys in the following order: 0103.
52. Press EXECUTE.
53. Verify that the REG SEL register indicates: 0000 000 111 111 001.
54. Press CL.
55. Press keys in the following order: 0104.
56. Press EXECUTE.
57. Verify that the REG SEL register indicates: 0011 001 101 111 100.
58. Press CL.
59. Press keys in the following order: 0105.
60. Press EXECUTE.

DATE ________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 REV: - PAGE 1 OF 10

INITIAL TDRR 32541 D.S. PGS. 1

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

Tests instructions, erasable memory, checks sum of program modules, special rope modules, interrupts and alarms, and input-output, and DSKYs (tests 1-60). These tests are run on the CTS and all fail and success patterns displayed on the CTS are described in this JDC.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES:

PS 2016007

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Assure cable W263 is properly connected.
2. Assure that all Ropes are installed in their proper positions.
3. Assure that all RDC Interface Panel switches are OFF.
4. Press CH30-15 and CH33-10 to ON.
5. Assure PARITY FAIL switch is OFF.
6. Set Register Select switch to A.
7. Set the ALGA switch to OFF.
8. Press MONITOR.
9. Set INHIBIT INTERRUPTS, INHIBIT INCREMENT, and T12 switches to ON.

DATE________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 REV: - PAGE 2 OF 10

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE

1. Press FRESH START, PROCEED, and ALARM RESET.
2. Press KEYBOARD LOAD and CL.
3. Press keys in the following order: 00067 77777.
4. Press EXECUTE and CL.
5. Press keys in the following order: 00076 77777.
6. Press EXECUTE and CL.
7. Press keys in the following order: 00077 77777.
8. Press EXECUTE and CL.
9. Press keys in the following order: 00100 77777.
10. Press EXECUTE and CL.
11. Press keys in the following order: 00101 77777.
12. Press EXECUTE and CL.
13. Press keys in the following order: 00102 00003.
14. Press EXECUTE and CL.
15. Press keys in the following order: 00103 00771.
16. Press EXECUTE and CL.
17. Press keys in the following order: 00104 31574.
18. Press EXECUTE and CL.
19. Press keys in the following order: 00105 00612.
20. Press EXECUTE and CL.

DATE________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 REV: - PAGE 3 OF 10

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (cont'd)

21. Press keys in the following order: 00106 13606.
22. Press EXECUTE and CL.
23. Press keys in the following order: 00117 00001.
24. Press EXECUTE and CL.
25. Press keys in the following order: 00120 77700.
26. Press EXECUTE, READ AGC, and CL.
27. Press keys in the following order: 0067.
28. Press EXECUTE.
29. Verify that the REG SEL register indicates: 1111 111 111 111 111.
30. Press CL.
31. Press keys in the following order: 0076.
32. Press EXECUTE.
33. Verify that the REG SEL registerindicates: 1111 111 111 111 111.
34. Press CL.
35. Press keys in the following order: 0077.
36. Press EXECUTE.
37. Verify that the REG SEL register indicates: 1111 111 111 111 111.
38. Press CL.
39. Press keys in the following order: 0100.
40. Press EXECUTE.

DATE________

JOB: CTS CONTROL OF NEWSPEAK

JDC: 05388 REV: - PAGE 4 OF 10

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (cont'd)

41. Verify that the REG SEL register indicates: 1111 111 111 111 111.
42. Press CL.
43. Press keys in the following order: 0101.
44. Press EXECUTE.
45. Verify that the REG SEL register indicates: 1111 111 111 111 111.
46. Press CL.
47. Press keys in the following order: 0102.
48. Press EXECUTE.
49. Verify that the REG SEL register indicates: 0000 000 000 000 011.
50. Press CL.
51. Press keys in the following order: 0103.
52. Press EXECUTE.
53. Verify that the REG SEL register indicates: 0000 000 111 111 001.
54. Press CL.
55. Press keys in the following order: 0104.
56. Press EXECUTE.
57. Verify that the REG SEL register indicates: 0011 001 101 111 100.
58. Press CL.
59. Press keys in the following order: 0105.
60. Press EXECUTE.

DATE________

JOB: CTS CONTROL OF NEWSPEAK
JDC 05388 **REV:** - **PAGE** 5 **OF** 10
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE

61. Verify that the REG SEL register indicates: 0000 000 110 001 010.
62. Press CL.
63 Press keys in the following order: 0106.
64. Press EXECUTE.
65. Verify that the REG SEL register indicates: 0001 011 110 000 110.
66. Press CL.
67. Press keys in the following order: 0117.
68. Press EXECUTE.
69. Verify that the REG SELregister indicates: 0000 000 000 000 001.
70. Press CL.
71. Press keys in the following order: 0120.
72. Press EXECUTE.
73. Verify that the REG SEL register indicates: 1111 111 111 000 000.
74. Press TRANSFER CONTROL AND CL.
75. Press keys in the following order: 4463.
76. Press EXECUTE and MONITOR.
77. Set T12, Inhibit Increments, and Inhibit Interrupt switches to OFF.
78. Press PROCEED.
79. Set ALGA to ON.

NOTE: If the subsystem contains two (2) DSKY's perform steps 80 and 81 with both DSKY's.

DATE__________

JOB: CTS CONTROL OF NEWSPEAK
JDC: 05388 **REV:** - **PAGE** 6 **OF** 10
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (cont'd)

80. Verify the following DSKY displays:
    a. displays blank except RESTART indicator is ON.
    b. all 9's, + signs, VERB and NOUN numbers and KEY REL and OPR ERR alarms flashing; remaining alarms and COMP ACTY indicator ON steady.
    c. all 8's, - signs, RESTART indicator ON.
    d. all 7's
    e. all 6's
    f. all 5's
    g. all 4's
    h. all 3's
    i. all 2's
    j. all 1's
    k. all 0's
    l. all positions blank

81. Verify the following DSKY displays:

REG1	70707
REG3	number of failures since start of JDC
VERB	00
NOUN	74
MODE	74
REG2	number represents the times thru one complete loop.

DATE__________

JOB: CTS CONTROL OF NEWSPEAK
JDC: 05388 **REV:** - **PAGE** 7 **OF** 10
SUBSYSTEM: Apollo Guidance Computer
ASSY:

NOTE: The following are the tests to be executed in order:

Test No.	Octal	Test Name	Reg Sel Register Display (If failure occurs)
1	01	ERASE MEM	0000 000 000 000 001
2	02	TS & TC	0000 000 000 000 010
3	03	CA, TS & AD	0000 000 000 000 011
4	04	CA & CCS	0000 000 000 000 100
5	05	TS OVERFLOW	0000 000 000 000 101
6	06	CCS LOOP	0000 000 000 000 110
7	07	AD LOOP 1	0000 000 000 000 111
8	10	AD LOOP 2	0000 000 000 001 000
9	11	LX CH	0000 000 000 001 001
10	12	XCH	0000 000 000 001 010
11	13	MASK	0000 000 000 001 011
12	14	CS	0000 000 000 001 100
13	15	NDX	0000 000 000 001 101
14	16	INCR	0000 000 000 001 110
15	17	DXCH	0000 000 000 001 111
16	20	DAS & ADS	0000 000 000 010 000
17	21	BZF	0000 000 000 010 001
18	22	BZMF	0000 000 000 010 010
19	23	DCA	0000 000 000 010 011
20	24	DCS	0000 000 000 010 100

DATE__________

JOB: CTS CONTROL OF NEWSPEAK
JDC: 05388 **REV:** - **PAGE** 8 **OF** 10
SUBSYSTEM: Apollo Guidance Computer
ASSY:

Test No.	Octal	Test Name	Reg. Sel Register Display (If failure occurs)
21	25	MSU	0000 000 000 010 101
22	26	QXCH	0000 000 000 010 110
23	27	SU	0000 000 000 010 111
24	30	AUG	0000 000 000 011 000
25	31	DIM	0000 000 000 011 001
26	32	INDEX	0000 000 000 011 010
27	33	MP	0000 000 000 011 011
28	34	DIVIDE	0000 000 000 011 100
29	35	READ	0000 000 000 011 101
30	36	WRITE	0000 000 000 011 110
31	37	RAND	0000 000 000 011 111
32	40	WAND	0000 000 000 100 000
33	41	ROR	0000 000 000 100 001
34	42	WOR	0000 000 000 100 010
35	43	RXOR	0000 000 000 100 011
36	44	CHECK SUM	0000 000 000 100 100
37	45	T3 RUPT	0000 000 000 100 101
38	46	T4 RUPT	0000 000 000 100 110
39	47	EDRUPT	0000 000 000 100 111
40	50	NO RUPT	0000 000 000 101 000

DATE__________

JOB: CTS CONTROL OF NEWSPEAK | **JDC** 05388 **REV:** - **PAGE** 5 **OF** 10
SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE

61. Verify that the REG SEL register indicates: 0000 000 110 001 010.
62. Press CL.
63 Press keys in the following order: 0106.
64. Press EXECUTE.
65. Verify that the REG SEL register indicates: 0001 011 110 000 110.
66. Press CL.
67. Press keys in the following order: 0117.
68. Press EXECUTE.
69. Verify that the REG SEL register indicates: 0000 000 000 000 001.
70. Press CL.
71. Press keys in the following order: 0120.
72. Press EXECUTE.
73. Verify that the REG SEL register indicates: 1111 111 111 000 000.
74. Press TRANSFER CONTROL AND CL.
75. Press keys in the following order: 4463.
76. Press EXECUTE and MONITOR.
77. Set T12, Inhibit Increments, and Inhibit Interrupt switches to OFF.
78. Press PROCEED.
79. Set ALGA to ON.

NOTE: If the subsystem contains two (2) DSKY's perform steps 80 and 81 with both DSKY's.

DATE________

JOB: CTS CONTROL OF NEWSPEAK | **JDC:** 05388 **REV:** - **PAGE** 6 **OF** 10
SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE (cont'd)

80. Verify the following DSKY displays:
    - a. displays blank except RESTART indicator is ON.
    - b. all 9's, + signs, VERB and NOUN numbers and KEY REL and OPR ERR alarms flashing; remaining alarms and COMP ACTY indicator ON steady.
    - c. all 8's, - signs, RESTART indicator ON.
    - d. all 7's
    - e. all 6's
    - f. all 5's
    - g. all 4's
    - h. all 3's
    - i. all 2's
    - j. all 1's
    - k. all 0's
    - l. all positions blank

81. Verify the following DSKY displays:

REG1	70707
REG3	number of failures since start of JDC
VERB	00
NOUN	74
MODE	74
REG2	number represents the times thru one complete loop.

DATE________

JOB: CTS CONTROL OF NEWSPEAK | **JDC:** 05388 **REV:** - **PAGE** 7 **OF** 10
SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

NOTE: The following are the tests to be executed in order:

Test No.	Octal	Test Name	Reg Sel Register Display (If failure occurs)
1	01	ERASE MEM	0000 000 000 000 001
2	02	TS & TC	0000 000 000 000 010
3	03	CA, TS & AD	0000 000 000 000 011
4	04	CA & CCS	0000 000 000 000 100
5	05	TS OVERFLOW	0000 000 000 000 101
6	06	CCS LOOP	0000 000 000 000 110
7	07	AD LOOP 1	0000 000 000 000 111
8	10	AD LOOP 2	0000 000 000 001 000
9	11	LX CH	0000 000 000 001 001
10	12	XCH	0000 000 000 001 010
11	13	MASK	0000 000 000 001 011
12	14	CS	0000 000 000 001 100
13	15	NDX	0000 000 000 001 101
14	16	INCR	0000 000 000 001 110
15	17	DXCH	0000 000 000 001 111
16	20	DAS & ADS	0000 000 000 010 000
17	21	BZF	0000 000 000 010 001
18	22	BZMF	0000 000 000 010 010
19	23	DCA	0000 000 000 010 011
20	24	DCS	0000 000 000 010 100

DATE________

JOB: CTS CONTROL OF NEWSPEAK | **JDC:** 05388 **REV:** - **PAGE** 8 **OF** 10
SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

Test No.	Octal	Test Name	Reg. Sel Register Display (If failure occurs)
21	25	MSU	0000 000 000 010 101
22	26	QXCH	0000 000 000 010 110
23	27	SU	0000 000 000 010 111
24	30	AUG	0000 000 000 011 000
25	31	DIM	0000 000 000 011 001
26	32	INDEX	0000 000 000 011 010
27	33	MP	0000 000 000 011 011
28	34	DIVIDE	0000 000 000 011 100
29	35	READ	0000 000 000 011 101
30	36	WRITE	0000 000 000 011 110
31	37	RAND	0000 000 000 011 111
32	40	WAND	0000 000 000 100 000
33	41	ROR	0000 000 000 100 001
34	42	WOR	0000 000 000 100 010
35	43	RXOR	0000 000 000 100 011
36	44	CHECK SUM	0000 000 000 100 100
37	45	T3 RUPT	0000 000 000 100 101
38	46	T4 RUPT	0000 000 000 100 110
39	47	EDRUPT	0000 000 000 100 111
40	50	NO RUPT	0000 000 000 101 000

DATE________

Test No.	Octal	Test Name	Reg Sel	Register Display (If failure occurs)
41	51	RUPTLOC	0000 000 000 101 001	
42	52	RELINT	0000 000 000 101 010	
43	53	PRIORITY (Simple)	0000 000 000 101 011	
44	54	BOD PARITY	0000 000 000 101 100	
45	55	ALL PARITY	0000 000 000 101 101	
46	56	INRUPT	0000 000 000 101 110	
47	57	TC TRAP	0000 000 000 101 111	
48	60	NIGHT WATCHMAN	0000 000 000 110 000	
49	61	SELF TEST	0000 000 000 110 001	
50	62	I/O START P	0000 000 000 110 010	
51	63	I/O STPIP	0000 000 000 110 011	
52	64	I/O TEST IV	0000 000 000 110 100	
53	65	I/O TEST 2V	0000 000 000 110 101	
54	66	I/O TEST 3V	0000 000 000 110 110	
55	67	I/O TEST 4V	0000 000 000 110 111	
56	70	I/O TEST 5V	0000 000 000 111 000	
57	71	I/O TEST 6V	0000 000 000 111 001	
58	72	SPECIAL ROPE	0000 000 000 111 010	
59	73	REG 20-23 + NDX GENERATION	0000 000 000 111 011	
60	74	DSKY INDICATORS	0000 000 000 111 100	

DATE ________

B. PROCEDURE (Cont)

82. Verify that REG SEL register indicates:1111 000 111 000 111, on steady for five seconds, flashing for five seconds, and on steady for five seconds. (after approximately 4 min.)

NOTE: To terminate the program perform the following steps:

a. Allow two 15 second display cycles, during flashing portion of third cycle set the ALGA switch to OFF.

b. Set INHIBIT INTERRUPTS, T12, and INHIBIT INCREMENTS, switches to ON.

83. On the Operations Console power control panel set the DSKY KEYBOARD VOLTAGE switch to 140V.

84. Adjust MAIN-NAV KEYBOARDS potentiometer for 75 ± 2V.

85. Using a scope hood, verify DSKY KEYBOARD numbers are illuminated.

86. Adjust MAIN-NAV KEYBOARDS potentiometer full counter clockwise.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05388.IDC
REV. -
INITIAL TDRR 32541

JOB: CTS CONTROL OF NEWSPEAK

ASSEMBLY UNDER TEST

TITLE Apollo Guidance Computer
SER. NO. ________ DWG. ________, REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE/LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ ________ CAL DATE
NAME ________ SER. NO. ________ ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

B. PROCEDURE

	Results	Limits
1. Steps 1 thru 82 performed with no indication of failure	______	Testman's Stamp
2. Steps 83 thru 86 performed with no indication of failure	______	Testman's Stamp

DATE ________

JOB: CTS CONTROL OF NEWSPEAK | **JDC:** 05388 **REV:** - **PAGE** 9 **OF** 10
SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

Test No.	Octal	Test Name	Reg Sel Register Display (If failure occurs)
41	51	RUPTLOC	0000 000 000 101 001
42	52	RELINT	0000 000 000 101 010
43	53	PRIORITY (Simple)	0000 000 000 101 011
44	54	BOD PARITY	0000 000 000 101 100
45	55	ALL PARITY	0000 000 000 101 101
46	56	INRUPT	0000 000 000 101 110
47	57	TC TRAP	0000 000 000 101 111
48	60	NIGHT WATCHMAN	0000 000 000 110 000
49	61	SELF TEST	0000 000 000 110 001
50	62	I/O START P	0000 000 000 110 010
51	63	I/O STPIP	0000 000 000 110 011
52	64	I/O TEST IV	0000 000 000 110 100
53	65	I/O TEST 2V	0000 000 000 110 101
54	66	I/O TEST 3V	0000 000 000 110 110
55	67	I/O TEST 4V	0000 000 000 110 111
56	70	I/O TEST 5V	0000 000 000 111 000
57	71	I/O TEST 6V	0000 000 000 111 001
58	72	SPECIAL ROPE	0000 000 000 111 010
59	73	REG 20-23 + NDX GENERATION	0000 000 000 111 011
60	74	DSKY INDICATORS	0000 000 000 111 100

DATE ________

JOB: CTS CONTROL OF NEWSPEAK | **JDC:** 05388 **REV:** - **PAGE** 10 **OF** 10
SUBSYSTEM: Apollo Guidance Control | **ASSY:**

B. PROCEDURE (Cont)

82. Verify that REG SEL register indicates:1111 000 111 000 111, on steady for five seconds, flashing for five seconds, and on steady for five seconds. (after approximately 4 min.)

    NOTE: To terminate the program perform the following steps:

    a. Allow two 15 second display cycles, during flashing portion of third cycle set the ALGA switch to OFF.

    b. Set INHIBIT INTERRUPTS, T12, and INHIBIT INCREMENTS, switches to ON.

83. On the Operations Console power control panel set the DSKY KEYBOARD VOLTAGE switch to 140V.

84. Adjust MAIN-NAV KEYBOARDS potentiometer for 75 ± 2V.

85. Using a scope hood, verify DSKY KEYBOARD numbers are illuminated.

86. Adjust MAIN-NAV KEYBOARDS potentiometer full counter clockwise.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1
JOB: CTS CONTROL OF NEWSPEAK

IDC
NO. 05388
REV. -
INITIAL TDRR 32541

ASSEMBLY UNDER TEST
TITLE Apollo Guidance Computer
SER. NO. ________ DWG. ________ REV. ____

TEST HISTORY
DATE ________ START ________ END ________ SITE/LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ________________ SER. NO. ________ CAL DATE
NAME ________________ SER. NO. ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

B. PROCEDURE

	Results	Limits
1. Steps 1 thru 82 performed with no indication of failure	________	Testman's Stamp
2. Steps 83 thru 86 performed with no indication of failure	________	Testman's Stamp

DATE ________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** A **PAGE** 1 **OF** 7
INITIAL TDRR 32541 **DS PGS** 3
SUBSYSTEM: Apollo Guidance Computer | **ASSY:**
DESCRIPTION:

This procedure measures certain logic "1" (one) levels for verification of specification compliance. Short loop programs are run to insure the appropriate signal is at the "1" (one) level.

Logic "1" Voltage Limits 0.870 - 1.200 VDC.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	3-2-[illegible]	33120	1, [illegible]	3	[illegible]	[illegible]

M

REFERENCES:

PS 2016007

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Perform JDC 05343 except for step B3, the AGC should be mounted on a table rather than the operations console to allow the monitoring of wirewrap pins. The tray A cover must be removed.

2. Perform JDC 05344 (equipment power turn on).

3. Perform JDC 05345 (computer power turn on).

NOTE: Making or breaking contact with pins while the short loop programs are running may cause the erasable memory to drop or gain a bit. Reload and transfer control if necessary. An occurance of this type is not to be considered a failure.

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** A **PAGE** 2 **OF** 7
SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE

1. Set Increments Inhibit switch to ON

2. Set Inhibit Interrupt switch to ON.

3. Set T12 OFF.

4. Press Proceed.

5. Insert Type W plug-in into oscilloscope.

6. Using oscilloscope, measure the one level at pin 130 of logic module A02 (signal $\overline{CT}$). Record on data sheet.

7. Using oscilloscope, measure the one level at pin 165 of logic module A01 (signal F10A). Record on data sheet.

8. Measure the one levels at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A01	302	F18AX
A02	219	$\underline{P04}$
A24	256	SBO
A02	342	T04
A02	309	T11

9. Turn ON AGC VOLTAGE CONTROL 2 switch.

10. Press Alarm Reset.

11. With the CONTROL 2 potentiometer slowly lower the voltage until AGC ALARMS indicator #7 comes ON or the voltage is lowered to 9.0 VDC. Do not lower the voltage below 9.0 VDC.

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** A **PAGE** 3 **OF** 7
SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE (Cont'd)

12. Measure the one levels at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A02	261	GOJAM
A03	206	STRTFC

13. Turn OFF AGC VOLTAGE CONTROL 2 switch.

14. Connect a jumper between pin 145 of logic module A02 and ground.

15. Using oscilloscope, measure the one level at pin 403 of A61 (signal STRT2). Record on data sheet.

16. Remove ground jumper between pin 145 (logic module A02) and ground.

17. Using oscilloscope, measure the one level at pin 145 of logic module A02 (signal Q2A). Record on data sheet.

18. Press Keyboard Load, CL, 00103 52525, and Execute.

19. Press Keys CL, 00104 25252, and Execute.

20. Press Keys CL, 00105 30103, and Execute.

21. Press Keys CL, 00106 30104, and Execute.

22. Press Keys CL, 00107 00105, and Execute.

23. Press Read AGC, CL, Keys 0103 and Execute.

24. Verify Reg Sel display of 1101 010 101 010 101.

25. Press Keys CL, 0104, and Execute.

26. Verify Reg Sel display of 0010 101 010 101 010.

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** A **PAGE** 4 **OF** 7
SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE (Cont'd)

27. Press Keys CL, 0105, and Execute.

28. Verify Reg Sel display of 0011 000 001 000 011.

29. Press Keys CL, 0106, and Execute.

30. Verify Reg Sel display of 0011 000 001 000 100.

31. Press Keys CL, 0107, and Execute.

32. Verify Reg Sel display of 0000 000 001 000 101.

33. Press Transfer Control, Keys CL, 0105, and Execute.

34. Using oscilloscope, measure the one level at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A08	153	G01
A08	127	$\overline{G01}$
A08	253	G02
A08	453	G03
A08	359	$\overline{G04}$
A11	159	$\overline{G13}$
A11	259	$\overline{G14}$
A11	459	$\overline{G15}$
A11	359	$\overline{G16}$
A08	159	$\overline{G05}$
A09	259	$\overline{G06}$
A09	459	$\overline{G07}$
A09	359	$\overline{G08}$
A10	159	$\overline{G09}$
A10	259	$\overline{G10}$
A10	459	$\overline{G11}$
A10	359	$\overline{G12}$
A12	220	$\overline{PC15}$
A10	465	WL11
A14	334	XB5
A14	332	XB6
A14	346	XB3

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS | JDC: 05392 REV: A PAGE 5 OF 7

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

35. Turn ON NISQ.
36. Turn ON T12.
37. Turn OFF NISQ. Turn ALGA OFF.
38. Press Keyboard Load, Keys CL, 00110 77777, and Execute.
39. Press Keys CL, 00111 30110, and Execute.
40. Press Keys CL, 00112 54001, and Execute.
41. Press Keys CL, 00113 00006, and Execute.
42. Press Keys CL, 00114 10107, and Execute.
43. Press Keys CL, 00115 00111, and Execute.
44. Press Read AGC Keys CL, 0110, and Execute. Verify Reg Sel display of 1111 111 111 111 111.
45. Press Keys CL, 0111, and Execute. Verify Reg Sel display of 0011 000 001 001 000.
46. Press Keys CL, 0112, and Execute. Verify Reg Sel display of 1101 100 000 000 001.
47. Press Keys CL, 0113, and Execute. Verify Reg Sel display of 0000 000 000 000 110.
48. Press Keys CL, 0114, and Execute. Verify Reg Sel display of 0001 000 001 000 111.
49. Press Keys CL, 0115, and Execute. Verify Reg Sel display of 0000 000 001 001 001.
50. Press Transfer Control, Keys CL, 0111, and Execute.
51. Set T12 OFF, and press Proceed.
52. Using oscilloscope measure the one level at designated pins of the following logic modules. Record on data sheet.

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS | JDC: 05392 REV: A PAGE 6 OF 7

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

52. (Cont'd)

Logic Module	Pin	Signal
A06	165	DVXP1
A04	210	DVI
A03	343	$\overline{EXSTO}$
A08	123	$\overline{L01}$
A02	105	$\overline{GOJAM}$

53. Turn ON NISQ. Turn ON T12.
54. Turn OFF NISQ.
55. Press Keyboard Load, Keys CL, 00116 30107 and Execute.
56. Press Keys CL, 00117 00006, and Execute.
57. Press Keys CL, 00120 70113, and Execute.
58. Press Keys CL, 00121 00116, and Execute.
59. Press Read AGC, Keys CL, 0116, and Execute. Verify Reg Sel display of 0011 000 001 000 111.
60. Press Keys CL, 0117, and Execute. Verify Reg Sel display of 0000 000 000 000 110.
61. Press Keys CL, 0120, and Execute. Verify Reg Sel display of 1111 000 001 001 011.
62. Press Keys CL, 0121, and Execute. Verify Reg Sel display of 0000 000 001 001 110.
63. Press Transfer Control, Keys CL, 0116, and Execute.
64. Set T12 OFF, and press Proceed.
65. Using oscilloscope, measure the one level at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A03	425	MP1
A03	413	MP3
A07	165	WALSG

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS | JDC: 05392 REV: A PAGE 7 OF 7

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

66. Turn ON NISQ. Turn ON T12.
67. Turn OFF NISQ. Turn ALGA ON.
68. Press Keyboard Load, Keys CL, 00122 30107, and Execute.
69. Press Keys CL, 00123 00006, and Execute.
70. Press Keys CL, 00125 00004, and Execute.
71. Press Keys CL, 00126 00123, and Execute.
72. Press Read AGC, Keys CL, 0122, and Execute. Verify REG SEL display of 0011 000 001 000 111.
73. Press Keys CL, 0123, and Execute. Verify REG SEL display of 0000 000 000 000 110.
74. Press Keys CL, 0125, and Execute. Verify REG SEL display of 0000 000 000 000 100.
75. Press Keys CL, 0126, and Execute. Verify REG SEL display of 0000 000 001 010 011.
76. Press Transfer Control, Keys CL, 0122, and Execute.
77. Set T12 OFF and press Proceed.
78. Using oscilloscope, measure the one level at pin 305 of Logic module A04 (signal INOUT). Record on data sheet.
79. Set T12 ON, ALGA OFF and STRT1/STRT2 to OFF.
80. Press Keyboard Load and press CL, 00013, and 02000.
81. Press CHANNEL and EXECUTE.
82. Press Keys CL, 00000, and 00000.
83. Press EXECUTE.
84. Press TRANSFER CONTROL, Keys CL, and 0000.
85. Press EXECUTE.
86. Set T12 OFF and Press Proceed.
87. Press STBY pushbutton on DSKY until STBY indicator turns ON.
88. Using oscilloscope (with Type W plug in unit) measure the one level of signal GOJAM at pin 261 of Logic module A02. Record on data sheet.
89. Set STRT1/STRT2 switch ON.
90. Press STBY pushbutton on DSKY until STBY indicator turns OFF.
91. Set T12 ON and press PROCEED.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC
NO. 05392
REV. A
INITIAL TDRR 32541

JOB: LOGIC SIGNAL MEASUREMENTS

ASSEMBLY UNDER TEST
TITLE Apollo Guidance Computer
SER. NO. ______ DWG. ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE/LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CA. DATE
NAME ______ SER. NO. ______ CA. DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

B.	PROCEDURE	Results	Limits
5.	A02/130 ($\overline{\text{CT}}$)		0.87 to 1.20 vdc
7.	A01/165		0.87 to 1.20 vdc
8.	A01/302 (F18AX)		0.87 to 1.20 vdc
	A02/219 (P04)		0.87 to 1.20 vdc
	A24/256 ($\overline{\text{SBO}}$)		0.87 to 1.20 vdc
	A02/342 (T04)		0.87 to 1.20 vdc
	A02/309 (T11)		0.87 to 1.20 vdc
12.	A02/261 (GOJAM)		0.87 to 1.20 vdc
	A03/206 (STRTFC)		0.87 to 1.20 vdc
15.	A61/403 (STRT2)		0.90 to 1.50 vdc
17.	A02/145 (Q2A)		2.8 to 3.8 vdc

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05392
REV. A

JOB: LOGIC SIGNAL MEASUREMENTS

B.	PROCEDURE (Cont'd)	Results	Limits
34.	A08/153 (G01)		0.87 to 1.20 vdc
	A08/127 ($\overline{\text{G01}}$)		0.87 to 1.20 vdc
	A08/253 (G02)		0.87 to 1.20 vdc
	A08/453 (G03)		0.87 to 1.20 vdc
	A08/359 ($\overline{\text{G04}}$)		0.87 to 1.20 vdc
	A11/159 ($\overline{\text{G13}}$)		0.87 to 1.20 vdc
	A11/259 ($\overline{\text{G14}}$)		0.87 to 1.20 vdc
	A11/459 ($\overline{\text{G15}}$)		0.87 to 1.20 vdc
	A11/359 ($\overline{\text{G16}}$)		0.87 to 1.20 vdc
	A08/159 ($\overline{\text{G05}}$)		0.87 to 1.20 vdc
	A09/259 ($\overline{\text{G06}}$)		0.87 to 1.20 vdc
	A09/459 ($\overline{\text{G07}}$)		0.87 to 1.20 vdc
	A09/359 ($\overline{\text{G08}}$)		0.87 to 1.20 vdc
	A10/159 ($\overline{\text{G09}}$)		0.87 to 1.20 vdc
	A10/259 ($\overline{\text{G10}}$)		0.87 to 1.20 vdc
	A10/459 ($\overline{\text{G11}}$)		0.87 to 1.20 vdc
	A10/359 ($\overline{\text{G12}}$)		0.87 to 1.20 vdc
	A12/220 ($\overline{\text{PC15}}$)		0.87 to 1.20 vdc

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05392
REV. ______

JOB: LOGIC SIGNAL MEASUREMENTS

B.	PROCEDURE (Cont'd)	Results	Limits
34.	(Continued)		
	A10/465 (WL11)		0.87 to 1.20 vdc
	A14/334 (XB5)		0.87 to 1.20 vdc
	A14/332 (XB6)		0.87 to 1.20 vdc
	A14/346 (XB3)		0.87 to 1.20 vdc
52.	A06/165 (DVXP1)		0.87 to 1.20 vdc
	A04/210 (DV1)		0.87 to 1.20 vdc
	A03/343 ($\overline{\text{EXSTO}}$)		0.87 to 1.20 vdc
	A08/123 ($\overline{\text{L01}}$)		0.87 to 1.20 vdc
	A02/105 (GOJAM)		0.87 to 11.20 vdc
65.	A03/425 (MP1)		0.87 to 1.20 vdc
	A03/413 (MP3)		0.87 to 1.20 vdc
	A07/165 (WALSG)		0.87 to 1.20 vdc
78.	A04/305 (INOUT)		0.87 to 1.20 vdc
88.	A02/261 (GOJAM)		0.78 to 1.20 vdc

DATE ______

JOB: LOGIC SIGNAL MEASUREMENTS | JDC: 05392 REV: B PAGE 1 OF 7 | INITIAL TDRR 32541 D.S. PGS. 3

SUBSYSTEM: Apollo Guidance Computer | ASSY:

DESCRIPTION:

This procedure measures certain logic "1" (one) levels for verification of specification compliance. Short loop programs are run to insure the appropriate signal is at the "1" (one) level.

Logic "1" Voltage Limits 0.87 - 1.40 VDC

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	3-2-[illegible]	[illegible]	1, [illegible]	3	DMS	DMS
B	8-3-67	34263	1	3	FA	FA

REFERENCES:

PS 2016007

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Perform JDC 05343 except for step B3, the AGC should be mounted on a table rather than the operations console to allow the monitoring of wirewrap pins. The tray A cover must be removed.

2. Perform JDC 05344 (equipment power turn on).

3. Perform JDC 05345 (computer power turn on).

NOTE: Making or breaking contact with pins while the short loop programs are running may cause the erasable memory to drop or gain a bit. Reload and transfer control if necessary. An occurance of this type is not to be considered a failure.

DATE ________

JOB: LOGIC SIGNAL MEASUREMENTS | JDC: 05392 REV: B PAGE 2 OF 7

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE

1. Set Increments Inhibit switch to ON

2. Set Inhibit Interrupt switch to ON.

3. Set T12 OFF.

4. Press Proceed.

5. Insert Type W plug-in into oscilloscope.

6. Using oscilloscope, measure the one level at pin 130 of logic module A02 (signal $\overline{\text{CT}}$). Record on data sheet.

7. Using oscilloscope, measure the one level at pin 165 of logic module A01 (signal F10A). Record on data sheet.

8. Measure the one levels at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A01	302	F18AX
A02	219	P04
A24	256	$\overline{\text{SBO}}$
A02	342	T04
A02	309	T11

9. Turn ON AGC VOLTAGE CONTROL 2 switch.

10. Press Alarm Reset.

11. With the CONTROL 2 potentiometer slowly lower the voltage until AGC ALARMS indicator #7 comes ON or the voltage is lowered to 9.0 VDC. Do not lower the voltage below 9.0 VDC.

DATE ________

JOB: LOGIC SIGNAL MEASUREMENTS | JDC: 05392 REV: B PAGE 3 OF 7

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

12. Measure the one levels at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A02	261	GOJAM
A03	206	STRTFC

13. Turn OFF AGC VOLTAGE CONTROL 2 switch.

14. Connect a jumper between pin 145 of logic module A02 and ground.

15. Using oscilloscope, measure the one level at pin 403 of A61 (signal STRT2). Record on data sheet.

16. Remove ground jumper between pin 145 (logic module A02)and ground.

17. Using oscilloscope, measure the one level at pin 145 of logic module A02 (signal Q2A). Record on data sheet.

18. Press Keyboard Load, CL, 00103 52525, and Execute.

19. Press Keys CL, 00104 25252, and Execute.

20. Press Keys CL, 00105 30103, and Execute.

21. Press Keys CL, 00106 30104, and Execute.

22. Press Keys CL, 00107 00105, and Execute.

23. Press Read AGC, CL, Keys 0103 and Execute.

24. Verify Reg Sel display of 1101 010 101 010 101.

25. Press Keys CL, 0104, and Execute.

26. Verify Reg Sel display of 0010 101 010 101 010.

DATE ________

JOB: LOGIC SIGNAL MEASUREMENTS | JDC: 05392 REV: B PAGE 4 OF 7

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

27. Press Keys CL, 0105, and Execute.

28. Verify Reg Sel display of 0011 000 001 000 011.

29. Press Keys CL, 0106, and Execute.

30. Verify Reg Sel display of 0011 000 001 000 100.

31. Press Keys CL, 0107, and Execute.

32. Verify Reg Sel display of 0000 000 001 000 101.

33. Press Transfer Control, Keys CL, 0105, and Execute.

34. Using oscilloscope, measure the one level at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A08	153	G01
A08	127	$\overline{\text{G01}}$
A08	253	G02
A08	453	G03
A08	359	$\overline{\text{G04}}$
A11	159	$\overline{\text{G13}}$
A11	259	$\overline{\text{G14}}$
A11	459	$\overline{\text{G15}}$
A11	359	$\overline{\text{G16}}$
A08	159	$\overline{\text{G05}}$
A09	259	$\overline{\text{G06}}$
A09	459	$\overline{\text{G07}}$
A09	359	$\overline{\text{G08}}$
A10	159	$\overline{\text{G09}}$
A10	259	$\overline{\text{G10}}$
A10	459	$\overline{\text{G11}}$
A10	359	$\overline{\text{G12}}$
A12	220	PC15
A10	465	WL11
A14	334	XB5
A14	332	XB6
A14	346	XB3

DATE ________

B. PROCEDURE (Cont'd)

35. Turn ON NISQ.

36. Turn ON T12.

37. Turn OFF NISQ. Turn ALGA OFF.

38. Press Keyboard Load, Keys CL, 00110 77777, and Execute.

39. Press Keys CL, 00111 30110, and Execute.

40. Press Keys CL, 00112 54001, and Execute.

41. Press Keys CL, 00113 00006, and Execute.

42. Press Keys CL, 00114 10107, and Execute.

43. Press Keys CL, 00115 00111, and Execute.

44. Press Read AGC Keys CL, 0110, and Execute. Verify Reg Sel display of 1111 111 111 111 111.

45. Press Keys CL, 0111, and Execute. Verify Reg Sel display of 0011 000 001 001 000.

46. Press Keys CL, 0112, and Execute. Verify Reg Sel display of 1101 100 000 000 001.

47. Press Keys CL, 0113, and Execute. Verify Reg Sel display of 0000 000 000 000 110.

48. Press Keys CL, 0114, and Execute. Verify Reg Sel display of 0001 000 001 000 111.

49. Press Keys CL, 0115, and Execute. Verify Reg Sel display of 0000 000 001 001 001.

50. Press Transfer Control, Keys CL, 0111, and Execute.

51. Set T12 OFF, and press Proceed.

52. Using oscilloscope measure the one level at designated pins of the following logic modules. Record on data sheet.

DATE________

B. PROCEDURE (Cont'd)

52. (Cont'd)

Logic Module	Pin	Signal
A06	165	DVXP1
A04	210	DVI
A03	343	$\overline{\text{EXSTO}}$
A08	123	$\overline{\text{L01}}$
A02	105	$\overline{\text{GOJAM}}$

53. Turn ON NISQ. Turn ON T12.

54. Turn OFF NISQ.

55. Press Keyboard Load, Keys CL, 00116 30107 and Execute.

56. Press Keys CL, 00117 00006, and Execute.

57. Press Keys CL, 00120 70113, and Execute.

58. Press Keys CL, 00121 00116, and Execute.

59. Press Read AGC, Keys CL, 0116, and Execute. Verify Reg Sel display of 0011 000 001 000 111.

60. Press Keys CL, 0117, and Execute. Verify Reg Sel display of 0000 000 000 000 110.

61. Press Keys CL, 0120, and Execute. Verify Reg Sel display of 1111 000 001 001 011.

62. Press Keys CL, 0121, and Execute. Verify Reg Sel display of 0000 000 001 001 110.

63. Press Transfer Control, Keys CL, 0116, and Execute.

64. Set T12 OFF, and press Proceed.

65. Using oscilloscope, measure the one level at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A03	425	MP1
A03	413	MP3
A07	165	WALSG

DATE________

B. PROCEDURE (Cont'd)

66. Turn ON NISQ. Turn ON T12.

67. Turn OFF NISQ. Turn ALGA ON.

68. Press Keyboard Load, Keys CL, 00122 30107, and Execute.

69. Press Keys CL, 00123 00006, and Execute.

70. Press Keys CL, 00125 00004, and Execute.

71. Press Keys CL, 00126 00123, and Execute.

72. Press Read AGC, Keys CL, 0122, and Execute. Verify REG SEL display of 0011 000 001 000 111.

73. Press Keys CL, 0123, and Execute. Verify REG SEL display of 0000 000 000 000 110.

74. Press Keys CL, 0125, and Execute. Verify REG SEL display of 0000 000 000 000 100.

75. Press Keys CL, 0126, and Execute. Verify REG SEL display of 0000 000 001 010 011.

76. Press Transfer Control, Keys CL, 0122, and Execute.

77. Set T12 OFF and press Proceed.

78. Using oscilloscope, measure the one level at pin 305 of Logic module A04 (signal INOUT). Record on data sheet.

79. Set T12 ON, ALGA OFF and STRT1/STRT2 to OFF.

80. Press Keyboard Load and press CL, 00013, and 02000.

81. Press CHANNEL and EXECUTE.

82. Press Keys CL, 00000, and 00000.

83. Press EXECUTE.

84. Press TRANSFER CONTROL, Keys CL, and 0000.

85. Press EXECUTE.

86. Set T12 OFF and Press Proceed.

87. Press STBY pushbutton on DSKY until STBY indicator turns ON.

88. Using oscilloscope (with Type W plug in unit) measure the one level of signal GOJAM at pin 261 of Logic module A02. Record on data sheet.

89. Set STRT1/STRT2 switch ON.

90. Press STBY pushbutton on DSKY until STBY indicator turns OFF.

DATE________

91. Set T12 ON and press PROCEED.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC
NO. 05392
REV. B
INITIAL TDRR 32541

JOB: LOGIC SIGNAL MEASUREMENTS

ASSEMBLY UNDER TEST

TITLE Apollo Guidance Computer
SER. NO. ______ DWG. ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE/LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL. DATE
NAME ______ SER. NO. ______ CAL. DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

B. PROCEDURE	Results	Limits
5. A02/130 ($\overline{\text{CT}}$)	______	0.87 to 1.40 vdc
7. A01/165	______	0.87 to 1.40 vdc
8. A01/302 (F18AX)	______	0.87 to 1.40 vdc
A02/219 (P04)	______	0.87 to 1.40 vdc
A24/256 ($\overline{\text{SBO}}$)	______	0.87 to 1.40 vdc
A02/342 (T04)	______	0.87 to 1.40 vdc
A02/309 (T11)	______	0.87 to 1.40 vdc
12. A02/261 (GOJAM)	______	0.87 to 1.40 vdc
A03/206 (STRTFC)	______	0.87 to 1.40 vdc
15. A61/403 (STRT2)	______	0.90 to 1.50 vdc
17. A02/145 (Q2A)	______	2.8 to 3.8 vdc

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05392
REV. B

JOB: LOGIC SIGNAL MEASUREMENTS

B. PROCEDURE (Cont'd)	Results	Limits
34. A08/153 (G01)	______	0.87 to 1.40 vdc
A08/127 ($\overline{\text{G01}}$)	______	0.87 to 1.40 vdc
A08/253 (G02)	______	0.87 to 1.40 vdc
A08/453 (G03)	______	0.87 to 1.40 vdc
A08/359 ($\overline{\text{G04}}$)	______	0.87 to 1.40 vdc
A11/159 ($\overline{\text{G13}}$)	______	0.87 to 1.40 vdc
A11/259 ($\overline{\text{G14}}$)	______	0.87 to 1.40 vdc
A11/459 ($\overline{\text{G15}}$)	______	0.87 to 1.40 vdc
A11/359 ($\overline{\text{G16}}$)	______	0.87 to 1.40 vdc
A08/159 ($\overline{\text{G05}}$)	______	0.87 to 1.40 vdc
A09/259 ($\overline{\text{G06}}$)	______	0.87 to 1.40 vdc
A09/459 ($\overline{\text{G07}}$)	______	0.87 to 1.40 vdc
A09/359 ($\overline{\text{G08}}$)	______	0.87 to 1.40 vdc
A10/159 ($\overline{\text{G09}}$)	______	0.87 to 1.40 vdc
A10/259 ($\overline{\text{G10}}$)	______	0.87 to 1.40 vdc
A10/459 ($\overline{\text{G11}}$)	______	0.87 to 1.40 vdc
A10/359 ($\overline{\text{G12}}$)	______	0.87 to 1.40 vdc
A12/220 ($\overline{\text{PC15}}$)	______	0.87 to 1.40 vdc

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05392
REV. B

JOB: LOGIC SIGNAL MEASUREMENTS

B. PROCEDURE (Cont'd)	Results	Limits
34. (Continued)		
A10/465 (WL11)	______	0.87 to 1.40 vdc
A14/334 (XB5)	______	0.87 to 1.40 vdc
A14/332 (XB6)	______	0.87 to 1.40 vdc
A14/346 (XB3)	______	0.87 to 1.40 vdc
52. A06/165 (DVXP1)	______	0.87 to 1.40 vdc
A04/210 (DV1)	______	0.87 to 1.40 vdc
A03/343 ($\overline{\text{EXSTO}}$)	______	0.87 to 1.40 vdc
A08/123 ($\overline{\text{L01}}$)	______	0.87 to 1.40 vdc
A02/105 ($\overline{\text{GOJAM}}$)	______	0.87 to 1.40 vdc
65. A03/425 (MP1)	______	0.87 to 1.40 vdc
A03/413 (MP3)	______	0.87 to 1.40 vdc
A07/165 (WALSG)	______	0.87 to 1.40 vdc
78. A04/305 (INOUT)	______	0.87 to 1.40 vdc
88. A02/261 (GOJAM)	______	0.87 to 1.40 vdc

DATE ______

JOB: LOGIC SIGNAL MEASUREMENTS

JDC: 05392 **REV:** C **PAGE:** 1 **OF** 7

INITIAL TDRR 32541 **D.S. PGS** 3

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

This procedure measures certain logic "1" (one) levels for verification of specification compliance. Short loop programs are run to insure the appropriate signal is at the "1" (one) level.

Logic "1" Voltage Limits 0.87 - 1.40 VDC

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	[illegible]-2-67	33120	1, 6	3	[illegible]	[illegible]
B	8-3-67	34263	1	3	FA	FA
C	10-6-67	34811	1	3	AB FA	AB FA

REFERENCES:

PS 2016007

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Perform JDC 05343 except for step B3, the AGC should be mounted on a table rather than the operations console to allow the monitoring of wirewrap pins. The tray A cover must be removed.

2. Perform JDC 05344 (equipment power turn on).

3. Perform JDC 05345 (computer power turn on).

NOTE: Making or breaking contact with pins while the short loop programs are running may cause the erasable memory to drop or gain a bit. Reload and transfer control if necessary. An occurance of this type is not to be considered a failure.

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS

JDC: 05392 **REV:** C **PAGE** 2 **OF** 7

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE

1. Set Increments Inhibit switch to ON
2. Set Inhibit Interrupt switch to ON.
3. Set T12 OFF.
4. Press Proceed.
5. Insert Type W plug-in into oscilloscope.
6. Using oscilloscope, measure the one level at pin 130 of logic module A02 (signal $\overline{CT}$). Record on data sheet.
7. Using oscilloscope, measure the one level at pin 165 of logic module A01 (signal F10A). Record on data sheet.
8. Measure the one levels at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A01	302	F18AX
A02	219	P04
A24	256	SBO
A02	342	T04
A02	309	T11

9. Turn ON AGC VOLTAGE CONTROL 2 switch.
10. Press Alarm Reset.
11. With the CONTROL 2 potentiometer slowly lower the voltage until AGC ALARMS indicator #7 comes ON or the voltage is lowered to 9.0 VDC. Do not lower the voltage below 9.0 VDC.

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS

JDC: 05392 **REV:** C **PAGE** [illegible] **OF** 7

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

12. Measure the one levels at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A02	261	GOJAM
A03	206	STRTFC

13. Turn OFF AGC VOLTAGE CONTROL 2 switch.
14. Connect a jumper between pin 145 of logic module A02 and ground.
15. Using oscilloscope, measure the one level at pin 403 of A61 (signal STRT2). Record on data sheet.
16. Remove ground jumper between pin 145 (logic module A02)and ground.
17. Using oscilloscope, measure the one level at pin 145 of logic module A02 (signal Q2A). Record on data sheet.
18. Press Keyboard Load, CL, 00103 52525, and Execute.
19. Press Keys CL, 00104 25252, and Execute.
20. Press Keys CL, 00105 30103, and Execute.
21. Press Keys CL, 00106 30104, and Execute.
22. Press Keys CL, 00107 00105, and Execute.
23. Press Read AGC, CL, Keys 0103 and Execute.
24. Verify Reg Sel display of 1101 010 101 010 101.
25. Press Keys CL, 0104, and Execute.
26. Verify Reg Sel display of 0010 101 010 101 010.

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS

JDC: 05392 **REV:** C **PAGE** 4 **OF** 7

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

27. Press Keys CL, 0105, and Execute.
28. Verify Reg Sel display of 0011 000 001 000 011.
29. Press Keys CL, 0106, and Execute.
30. Verify Reg Sel display of 0011 000 001 000 100.
31. Press Keys CL, 0107, and Execute.
32. Verify Reg Sel display of 0000 000 001 000 101.
33. Press Transfer Control, Keys CL, 0105, and Execute.
34. Using oscilloscope, measure the one level at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A08	153	G01
A08	127	$\overline{G01}$
A08	253	G02
A08	453	G03
A08	359	$\overline{G04}$
A11	159	$\overline{G13}$
A11	259	$\overline{G14}$
A11	459	$\overline{G15}$
A11	359	$\overline{G16}$
A08	159	$\overline{G05}$
A09	259	$\overline{G06}$
A09	459	$\overline{G07}$
A09	359	$\overline{G08}$
A10	159	$\overline{G09}$
A10	259	$\overline{G10}$
A10	459	$\overline{G11}$
A10	359	$\overline{G12}$
A12	220	$\overline{PC15}$
A10	465	WL11
A14	334	XB5
A14	332	XB6
A14	346	XB3

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** C **PAGE** 5 **OF** 7

SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE (Cont'd)

35. Turn ON NISQ.
36. Turn ON T12.
37. Turn OFF NISQ. Turn ALGA OFF.
38. Press Keyboard Load, Keys CL, 00110 77777, and Execute.
39. Press Keys CL, 00111 30110, and Execute.
40. Press Keys CL, 00112 54001, and Execute.
41. Press Keys CL, 00113 00006, and Execute.
42. Press Keys CL, 00114 10107, and Execute.
43. Press Keys CL, 00115 00111, and Execute.
44. Press Read AGC Keys CL, 0110, and Execute. Verify Reg Sel display of 1111 111 111 111 111.
45. Press Keys CL, 0111, and Execute. Verify Reg Sel display of 0011 000 001 001 000.
46. Press Keys CL, 0112, and Execute. Verify Reg Sel display of 1101 100 000 000 001.
47. Press Keys CL, 0113, and Execute. Verify Reg Sel display of 0000 000 000 000 110.
48. Press Keys CL, 0114, and Execute. Verify Reg Sel display of 0001 000 001 000 111.
49. Press Keys CL, 0115, and Execute. Verify Reg Sel display of 0000 000 001 001 001.
50. Press Transfer Control, Keys CL, 0111, and Execute.
51. Set T12 OFF, and press Proceed.
52. Using oscilloscope measure the one level at designated pins of the following logic modules. Record on data sheet.

DATE__________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** C **PAGE** 6 **OF** 7

SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE (Cont'd)

52. (Cont'd)

Logic Module	Pin	Signal
A06	165	DVXP1
A04	210	DVI
A03	343	$\overline{\mathrm{EXSTO}}$
A08	123	$\overline{\mathrm{LOI}}$
A02	105	$\overline{\mathrm{GOJAM}}$

53. Turn ON NISQ. Turn ON T12.
54. Turn OFF NISQ.
55. Press Keyboard Load, Keys CL, 00116 30107 and Execute.
56. Press Keys CL, 00117 00006, and Execute.
57. Press Keys CL, 00120 70113, and Execute.
58. Press Keys CL, 00121 00116, and Execute.
59. Press Read AGC, Keys CL, 0116, and Execute. Verify Reg Sel display of 0011 000 001 000 111.
60. Press Keys CL, 0117, and Execute. Verify Reg Sel display of 0000 000 000 000 110.
61. Press Keys CL, 0120, and Execute. Verify Reg Sel display of 1111 000 001 001 011.
62. Press Keys CL, 0121, and Execute. Verify Reg Sel display of 0000 000 001 001 110.
63. Press Transfer Control, Keys CL, 0116, and Execute.
64. Set T12 OFF, and press Proceed.
65. Using oscilloscope, measure the one level at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A03	425	MP1
A03	413	MP3
A07	165	WALSG

DATE__________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** C **PAGE** 7 **OF** 7

SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE (Cont'd)

66. Turn ON NISQ. Turn ON T12.
67. Turn OFF NISQ. Turn ALGA ON.
68. Press Keyboard Load, Keys CL, 00122 30107, and Execute.
69. Press Keys CL, 00123 00006, and Execute.
70. Press Keys CL, 00125 00004, and Execute.
71. Press Keys CL, 00126 00123, and Execute.
72. Press Read AGC, Keys CL, 0122, and Execute. Verify REG SEL display of 0011 000 001 000 111.
73. Press Keys CL, 0123, and Execute. Verify REG SEL display of 0000 000 000 000 110.
74. Press Keys CL, 0125, and Execute. Verify REG SEL display of 0000 000 000 000 100.
75. Press Keys CL, 0126, and Execute. Verify REG SEL display of 0000 000 001 010 011.
76. Press Transfer Control, Keys CL, 0122, and Execute.
77. Set T12 OFF and press Proceed.
78. Using oscilloscope, measure the one level at pin 305 of Logic module A04 (signal INOUT). Record on data sheet.
79. Set T12 ON, ALGA OFF and STRT1/STRT2 to OFF.
80. Press Keyboard Load and press CL, 00013, and 02000.
81. Press CHANNEL and EXECUTE.
82. Press Keys CL, 00000, and 00000.
83. Press EXECUTE.
84. Press TRANSFER CONTROL, Keys CL, and 0000.
85. Press EXECUTE.
86. Set T12 OFF and Press Proceed.
87. Press STBY pushbutton on DSKY until STBY indicator turns ON.
88. Using oscilloscope (with Type W plug in unit) measure the one level of signal GOJAM at pin 261 of Logic module A02. Record on data sheet.
89. Set STRT1/STRT2 switch ON.
90. Press STBY pushbutton on DSKY until STBY indicator turns OFF.
91. Set T12 ON and press PROCEED.

DATE__________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC
NO. 05392
REV. C
INITIAL TDRR 325L

JOB: LOGIC SIGNAL MEASUREMENTS

ASSEMBLY UNDER TEST
TITLE Apollo Guidance Computer
SER. NO. ________ DWG. ________ REV. ____

TEST HISTORY
DATE ________ START ________ END ________ SITE/LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______________________ SER. NO. ________ CAL DATE
NAME ______________________ SER. NO. ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION
APPROVED BY ________ NAME/AFFILIATION

B. PROCEDURE		Results	Limits
5.	A02/130 ($\overline{\text{CT}}$)	______	0.87 to 1.40 vdc
7.	A01/165	______	0.87 to 1.40 vdc
8.	A01/302 (F18AX)	______	0.87 to 1.40 vdc
	A02/219 (P04)	______	0.87 to 1.40 vdc
	A24/256 ($\overline{\text{SBO}}$)	______	0.87 to 1.40 vdc
	A02/342 (T04)	______	0.87 to 1.40 vdc
	A02/309 (T11)	______	0.87 to 1.40 vdc
12.	A02/261 (GOJAM)	______	0.87 to 1.40 vdc
	A03/206 (STRTFC)	______	0.87 to 1.40 vdc
15.	A61/403 (STRT2)	______	0.90 to 1.50 vdc
17.	A02/145 (Q2A)	______	2.8 to 3.8 vdc

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05392
REV. C

JOB: LOGIC SIGNAL MEASUREMENTS

B. PROCEDURE (Cont'd)		Results	Limits
34.	A08/153 (G01)	______	0.87 to 1.40 vdc
	A08/127 ($\overline{\text{G01}}$)	______	0.87 to 1.40 vdc
	A08/253 (G02)	______	0.87 to 1.40 vdc
	A08/453 (G03)	______	0.87 to 1.40 vdc
	A08/359 ($\overline{\text{G04}}$)	______	0.87 to 1.40 vdc
	A11/159 ($\overline{\text{G13}}$)	______	0.87 to 1.40 vdc
	A11/259 ($\overline{\text{G14}}$)	______	0.87 to 1.40 vdc
	A11/459 ($\overline{\text{G15}}$)	______	0.87 to 1.40 vdc
	A11/359 ($\overline{\text{G16}}$)	______	0.87 to 1.40 vdc
	A08/159 ($\overline{\text{G05}}$)	______	0.87 to 1.40 vdc
	A09/259 ($\overline{\text{G06}}$)	______	0.87 to 1.40 vdc
	A09/459 ($\overline{\text{G07}}$)	______	0.87 to 1.40 vdc
	A09/359 ($\overline{\text{G08}}$)	______	0.87 to 1.40 vdc
	A10/159 ($\overline{\text{G09}}$)	______	0.87 to 1.40 vdc
	A10/259 ($\overline{\text{G10}}$)	______	0.87 to 1.40 vdc
	A10/459 ($\overline{\text{G11}}$)	______	0.87 to 1.40 vdc
	A10/359 ($\overline{\text{G12}}$)	______	0.87 to 1.40 vdc
	A12/220 ($\overline{\text{PC15}}$)	______	0.87 to 1.40 vdc

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05392
REV. — C

JOB: LOGIC SIGNAL MEASUREMENTS

B. PROCEDURE (Cont'd)		Results	Limits
34.	(Continued)		
	A10/465 (WL11)	______	0.87 to 1.40 vdc
	A14/334 (XB5)	______	0.87 to 1.40 vdc
	A14/332 (XB6)	______	0.87 to 1.40 vdc
	A14/346 (XB3)	______	0.87 to 1.40 vdc
52.	A06/165 (DVXP1)	______	0.87 to 1.40 vdc
	A04/210 (DV1)	______	0.87 to 1.40 vdc
	A03/343 ($\overline{\text{EXSTO}}$)	______	0.87 to 1.40 vdc
	A08/123 ($\overline{\text{L01}}$)	______	0.87 to 1.40 vdc
	A02/105 ($\overline{\text{GOJAM}}$)	______	0.87 to 1.40 vdc
65.	A03/425 (MP1)	______	0.87 to 1.40 vdc
	A03/413 (MP3)	______	0.87 to 1.40 vdc
	A07/165 (WALSG)	______	0.87 to 1.40 vdc
78.	A04/305 (INOUT)	______	0.87 to 1.40 vdc
88.	A02/261 (GOJAM)	______	0.78 to 1.40 vdc

DATE ________

JOB: LOGIC SIGNAL MEASUREMENTS

JDC: 05392 **REV:** - **PAGE** 1 **OF** 7

INITIAL TDRR 32541 **D.S. PGS.** 3

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

This procedure measures certain logic "1" (one) levels for verification of specification compliance. Short loop programs are run to insure the appropriate signal is at the "1" (one) level.

Logic "1" Voltage Limits 0.870 - 1.200 VDC.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES:

PS 2016007

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Perform JDC 05343 except for step B3, the AGC should be mounted on a table rather than the operations console to allow the monitoring of wirewrap pins. The tray A cover must be removed.
2. Perform JDC 05344 (equipment power turn on).
3. Perform JDC 05345 (computer power turn on).

NOTE: Making or breaking contact with pins while the short loop programs are running may cause the erasable memory to drop or gain a bit. Reload and transfer control if necessary. An occurance of this type is not to be considered a failure.

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS

JDC: 05392 **REV:** - **PAGE** 2 **OF** 7

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE

1. Set Increments Inhibit switch to ON
2. Set Inhibit Interrupt switch to ON.
3. Set T12 OFF.
4. Press Proceed.
5. Insert Type W plug-in into oscilloscope.
6. Using oscilloscope, measure the one level at pin 130 of logic module A02 (signal $\overline{CT}$). Record on data sheet.
7. Using oscilloscope, measure the one level at pin 165 of logic module A01 (signal F10A). Record on data sheet.
8. Measure the one levels at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A01	302	F18AX
A02	219	P04
A24	256	SBO
A02	342	T04
A02	309	T11

9. Turn ON AGC VOLTAGE CONTROL 2 switch.
10. Press Alarm Reset.
11. With the CONTROL 2 potentiometer slowly lower the voltage until AGC ALARMS indicator #7 comes ON or the voltage is lowered to 9.0 VDC. Do not lower the voltage below 9.0 VDC.

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS

JDC: 05392 **REV:** - **PAGE** 3 **OF** 7

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

12. Measure the one levels at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A02	261	OOJAM
A03	206	STRTFC

13. Turn OFF AGC VOLTAGE CONTROL 2 switch.
14. Connect a jumper between pin 145 of logic module A02 and ground.
15. Using oscilloscope, measure the one level at pin 403 of A61 (signal STRT2). Record on data sheet.
16. Remove ground jumper between pin 145 (logic module A02) and ground.
17. Using oscilloscope, measure the one level at pin 145 of logic module A02 (signal Q2A). Record on data sheet.
18. Press Keyboard Load, CL, 00103 52525, and Execute.
19. Press Keys CL, 00104 25252, and Execute.
20. Press Keys CL, 00105 30103, and Execute.
21. Press Keys CL, 00106 30104, and Execute.
22. Press Keys CL, 00107 00105, and Execute.
23. Press Read AGC, CL, Keys 0103 and Execute.
24. Verify Reg Sel display of 1101 010 101 010 101.
25. Press Keys CL, 0104, and Execute.
26. Verify Reg Sel display of 0010 101 010 101 010.

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS

JDC: 05392 **REV:** - **PAGE** 4 **OF** 7

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

27. Press Keys CL, 0105, and Execute.
28. Verify Reg Sel display of 0011 000 001 000 011.
29. Press Keys CL, 0106, and Execute.
30. Verify Reg Sel display of 0011 000 001 000 100.
31. Press Keys CL, 0107, and Execute.
32. Verify Reg Sel display of 0000 000 001 000 101.
33. Press Transfer Control, Keys CL, 0105, and Execute.
34. Using oscilloscope, measure the one level at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A08	153	G01
A08	127	$\overline{G01}$
A08	253	G02
A08	453	G03
A08	359	$\overline{G04}$
A11	159	$\overline{G13}$
A11	259	$\overline{G14}$
A11	459	$\overline{G15}$
A11	359	$\overline{G16}$
A08	159	$\overline{G05}$
A09	259	$\overline{G06}$
A09	459	$\overline{G07}$
A09	359	$\overline{G08}$
A10	159	$\overline{G09}$
A10	259	$\overline{G10}$
A10	459	$\overline{G11}$
A10	359	$\overline{G12}$
A12	220	$\overline{PC15}$
A10	465	WL11
A14	334	XB5
A14	332	XB6
A14	346	XB3

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS
JDC: 05392 REV: - PAGE 1 OF 7
INITIAL TDRR 32541 D.S PGS. 3
SUBSYSTEM: Apollo Guidance Computer
ASSY:
DESCRIPTION:

This procedure measures certain logic "1" (one) levels for verification of specification compliance. Short loop programs are run to insure the appropriate signal is at the "1" (one) level.

Logic "1" Voltage Limits 0.870 - 1.200 VDC.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES:

PS 2016007

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Perform JDC 05343 except for step B3, the AGC should be mounted on a table rather than the operations console to allow the monitoring of wirewrap pins. The tray A cover must be removed.

2. Perform JDC 05344 (equipment power turn on).

3. Perform JDC 05345 (computer power turn on).

NOTE: Making or breaking contact with pins while the short loop programs are running may cause the erasable memory to drop or gain a bit. Reload and transfer control if necessary. An occurance of this type is not to be considered a failure.

DATE ________

JOB: LOGIC SIGNAL MEASUREMENTS
JDC: 05392 REV: - PAGE 2 OF 7
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE

1. Set Increments Inhibit switch to ON

2. Set Inhibit Interrupt switch to ON.

3. Set T12 OFF.

4. Press Proceed.

5. Insert Type W plug-in into oscilloscope.

6. Using oscilloscope, measure the one level at pin 130 of logic module A02 (signal $\overline{CT}$). Record on data sheet.

7. Using oscilloscope, measure the one level at pin 165 of logic module A01 (signal F10A). Record on data sheet.

8. Measure the one levels at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A01	302	F18AX
A02	219	P04
A24	256	SBO
A02	342	T04
A02	309	T11

9. Turn ON AGC VOLTAGE CONTROL 2 switch.

10. Press Alarm Reset.

11. With the CONTROL 2 potentiometer slowly lower the voltage until AGC ALARMS indicator #7 comes ON or the voltage is lowered to 9.0 VDC. Do not lower the voltage below 9.0 VDC.

DATE ________

JOB: LOGIC SIGNAL MEASUREMENTS
JDC: 05392 REV: - PAGE 3 OF 7
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (Cont'd)

12. Measure the one levels at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A02	261	OOJAM
A03	206	STRTFC

13. Turn OFF AGC VOLTAGE CONTROL 2 switch.

14. Connect a jumper between pin 145 of logic module A02 and ground.

15. Using oscilloscope, measure the one level at pin 403 of A61 (signal STRT2). Record on data sheet.

16. Remove ground jumper between pin 145 (logic module A02) and ground.

17. Using oscilloscope, measure the one level at pin 145 of logic module A02 (signal Q2A). Record on data sheet.

18. Press Keyboard Load, CL, 00103 52525, and Execute.

19. Press Keys CL, 00104 25252, and Execute.

20. Press Keys CL, 00105 30103, and Execute.

21. Press Keys CL, 00106 30104, and Execute.

22. Press Keys CL, 00107 00105, and Execute.

23. Press Read AGC, CL, Keys 0103 and Execute.

24. Verify Reg Sel display of 1101 010 101 010 101.

25. Press Keys CL, 0104, and Execute.

26. Verify Reg Sel display of 0010 101 010 101 010.

DATE ________

JOB: LOGIC SIGNAL MEASUREMENTS
JDC: 05392 REV: - PAGE 4 OF 7
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (Cont'd)

27. Press Keys CL, 0105, and Execute.

28. Verify Reg Sel display of 0011 000 001 000 011.

29. Press Keys CL, 0106, and Execute.

30. Verify Reg Sel display of 0011 000 001 000 100.

31. Press Keys CL, 0107, and Execute.

32. Verify Reg Sel display of 0000 000 001 000 101.

33. Press Transfer Control, Keys CL, 0105, and Execute.

34. Using oscilloscope, measure the one level at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A08	153	G01
A08	127	$\overline{G01}$
A08	253	G02
A08	453	G03
A08	359	$\overline{G04}$
A11	159	$\overline{G13}$
A11	259	$\overline{G14}$
A11	459	$\overline{G15}$
A11	359	$\overline{G16}$
A08	159	$\overline{G05}$
A09	259	$\overline{G06}$
A09	459	$\overline{G07}$
A09	359	$\overline{G08}$
A10	159	$\overline{G09}$
A10	259	$\overline{G10}$
A10	459	$\overline{G11}$
A10	359	$\overline{G12}$
A12	220	$\overline{PC15}$
A10	465	WL11
A14	334	XB5
A14	332	XB6
A14	346	XB3

DATE ________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** - **PAGE** 5 **OF** 7

SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE (Cont'd)

35. Turn ON NISQ.
36. Turn ON T12.
37. Turn OFF NISQ. Turn ALGA OFF.
38. Press Keyboard Load, Keys CL, 00110 77777, and Execute.
39. Press Keys CL, 00111 30110, and Execute.
40. Press Keys CL, 00112 54001, and Execute.
41. Press Keys CL, 00113 00006, and Execute.
42. Press Keys CL, 00114 10107, and Execute.
43. Press Keys CL, 00115 00111, and Execute.
44. Press Read AGC Keys CL, 0110, and Execute. Verify Reg Sel display of 1111 111 111 111 111.
45. Press Keys CL, 0111, and Execute. Verify Reg Sel display of 0011 000 001 001 000.
46. Press Keys CL, 0112, and Execute. Verify Reg Sel display of 1101 100 000 000 001.
47. Press Keys CL, 0113, and Execute. Verify Reg Sel display of 0000 000 000 000 110.
48. Press Keys CL, 0114, and Execute. Verify Reg Sel display of 0001 000 001 000 111.
49. Press Keys CL, 0115, and Execute. Verify Reg Sel display of 0000 000 001 001 001.
50. Press Transfer Control, Keys CL, 0111, and Execute.
51. Set T12 OFF, and press Proceed.
52. Using oscilloscope measure the one level at designated pins of the following logic modules. Record on data sheet.

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** - **PAGE** 6 **OF** 7

SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE (Cont'd)

52. (Cont'd)

Logic Module	Pin	Signal
A06	165	DVXP1
A04	210	DVI
A03	343	$\overline{\text{EXSTO}}$
A08	123	$\overline{\text{LO1}}$

53. Turn ON NISQ. Turn ON T12.
54. Turn OFF NISQ.
55. Press Keyboard Load, Keys CL, 00116 30107 and Execute.
56. Press Keys CL, 00117 00006, and Execute.
57. Press Keys CL, 00120 70113, and Execute.
58. Press Keys CL, 00121 00116, and Execute.
59. Press Read AGC, Keys CL, 0116, and Execute. Verify Reg Sel display of 0011 000 001 000 111.
60. Press Keys CL, 0117, and Execute. Verify Reg Sel display of 0000 000 000 000 110.
61. Press Keys CL, 0120, and Execute. Verify Reg Sel display of 1111 000 001 001 011.
62. Press Keys CL, 0121, and Execute. Verify Reg Sel display of 0000 000 001 001 110.
63. Press Transfer Control, Keys CL, 0116, and Execute.
64. Set T12 OFF, and press Proceed.
65. Using oscilloscope, measure the one level at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A03	425	MP1
A03	413	MP3
A07	165	WALSG

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** - **PAGE** 7 **OF** 7

SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE (Cont'd)

66. Turn ON NISQ. Turn ON T12.
67. Turn OFF NISQ. Turn ALGA ON.
68. Press Keyboard Load, Keys CL, 00122 30107, and Execute.
69. Press Keys CL, 00123 00006, and Execute.
70. Press Keys CL, 00125 00004, and Execute.
71. Press Keys CL, 00126 00123, and Execute.
72. Press Read AGC, Keys CL, 0122, and Execute. Verify REG SEL display of 0011 000 001 000 111.
73. Press Keys CL, 0123, and Execute. Verify REG SEL display of 0000 000 000 000 110.
74. Press Keys CL, 0125, and Execute. Verify REG SEL display of 0000 000 000 000 100.
75. Press Keys CL, 0126, and Execute. Verify REG SEL display of 0000 000 001 010 011.
76. Press Transfer Control, Keys CL, 0122, and Execute.
77. Set T12 OFF and press Proceed.
78. Using oscilloscope, measure the one level at pin 305 of Logic module A04 (signal INOUT). Record on data sheet.
79. Set T12 ON, ALGA OFF and STRT1/STRT2 to OFF.
80. Press Keyboard Load and press CL, 00013, and 02000.
81. Press CHANNEL and EXECUTE.
82. Press Keys CL, 00000, and 00000.
83. Press EXECUTE.
84. Press TRANSFER CONTROL, Keys CL, and 0000.
85. Press EXECUTE.
86. Set T12 OFF and Press Proceed.
87. Press STBY pushbutton on DSKY until STBY indicator turns ON.
88. Using oscilloscope (with Type W plug in unit) measure the one level of signal GOJAM at pin 261 of Logic module A02. Record on data sheet.
89. Set STRT1/STRT2 switch ON.
90. Press STBY pushbutton on DSKY until STBY indicator turns OFF.
91. Set T12 ON and press PROCEED.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC
NO. 05392
REV. -
INITIAL TDRR 32541

JOB: LOGIC SIGNAL MEASUREMENTS

ASSEMBLY UNDER TEST		**TEST HISTORY**	
TITLE Apollo Guidance Computer		DATE ______ START	______ END ______ SITE/LOCATION
SER. NO. ______ DWG. ______ REV. ______		TIME ______ START	______ END ______ TOTAL ELAPSED
MAJOR GROUND SUPPORT EQUIPMENT			
NAME ______		SER. NO. ______	______ CAL DATE
NAME ______		SER. NO. ______	______ CAL DATE
CONDUCTED BY ______ NAME/AFFILIATION		APPROVED BY ______ NAME/AFFILIATION	

B. PROCEDURE

		Results	Limits
5.	A02/130 ($\overline{\text{CT}}$)	______	0.87 to 1.20 vdc
7.	A01/165	______	0.87 to 1.20 vdc
8.	A01/302 (F18AX)	______	0.87 to 1.20 vdc
	A02/219 (P04)	______	0.87 to 1.20 vdc
	A24/256 ($\overline{\text{SBO}}$)	______	0.87 to 1.20 vdc
	A02/342 (T04)	______	0.87 to 1.20 vdc
	A02/309 (T11)	______	0.87 to 1.20 vdc
12.	A02/261 (GOJAM)	______	0.87 to 1.20 vdc
	A03/206 (STRTFC)	______	0.87 to 1.20 vdc
15.	A61/403 (STRT2)	______	0.90 to 1.50 vdc
17.	A02/145 (Q2A)	______	2.8 to 3.8 vdc

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** - **PAGE** 5 **OF** 7

SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE (Cont'd)

35. Turn ON NISQ.
36. Turn ON T12.
37. Turn OFF NISQ. Turn ALGA OFF.
38. Press Keyboard Load, Keys CL, 00110 77777, and Execute.
39. Press Keys CL, 00111 30110, and Execute.
40. Press Keys CL, 00112 54001, and Execute.
41. Press Keys CL, 00113 00006, and Execute.
42. Press Keys CL, 00114 10107, and Execute.
43. Press Keys CL, 00115 00111, and Execute.
44. Press Read AGC Keys CL, 0110, and Execute. Verify Reg Sel display of 1111 111 111 111 111.
45. Press Keys CL, 0111, and Execute. Verify Reg Sel display of 0011 000 001 001 000.
46. Press Keys CL, 0112, and Execute. Verify Reg Sel display of 1101 100 000 000 001.
47. Press Keys CL, 0113, and Execute. Verify Reg Sel display of 0000 000 000 000 110.
48. Press Keys CL, 0114, and Execute. Verify Reg Sel display of 0001 000 001 000 111.
49. Press Keys CL, 0115, and Execute. Verify Reg Sel display of 0000 000 001 001 001.
50. Press Transfer Control, Keys CL, 0111, and Execute.
51. Set T12 OFF, and press Proceed.
52. Using oscilloscope measure the one level at designated pins of the following logic modules. Record on data sheet.

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** - **PAGE** 6 **OF** 7

SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE (Cont'd)

52. (Cont'd)

Logic Module	Pin	Signal
A06	165	DVXP1
A04	210	DVI
A03	343	$\overline{\mathrm{EXSTO}}$
A08	123	$\overline{\mathrm{LOI}}$

53. Turn ON NISQ. Turn ON T12.
54. Turn OFF NISQ.
55. Press Keyboard Load, Keys CL, 00116 30107 and Execute.
56. Press Keys CL, 00117 00006, and Execute.
57. Press Keys CL, 00120 70113, and Execute.
58. Press Keys CL, 00121 00116, and Execute.
59. Press Read AGC, Keys CL, 0116, and Execute. Verify Reg Sel display of 0011 000 001 000 111.
60. Press Keys CL, 0117, and Execute. Verify Reg Sel display of 0000 000 000 000 110.
61. Press Keys CL, 0120, and Execute. Verify Reg Sel display of 1111 000 001 001 011.
62. Press Keys CL, 0121, and Execute. Verify Reg Sel display of 0000 000 001 001 110.
63. Press Transfer Control, Keys CL, 0116, and Execute.
64. Set T12 OFF, and press Proceed.
65. Using oscilloscope, measure the one level at designated pins of the following logic modules. Record on data sheet.

Logic Module	Pin	Signal
A03	425	MP1
A03	413	MP3
A07	165	WALSG

DATE________

JOB: LOGIC SIGNAL MEASUREMENTS | **JDC:** 05392 **REV:** - **PAGE** 7 **OF** 7

SUBSYSTEM: Apollo Guidance Computer | **ASSY:**

B. PROCEDURE (Cont'd)

66. Turn ON NISQ. Turn ON T12.
67. Turn OFF NISQ. Turn ALGA ON.
68. Press Keyboard Load, Keys CL, 00122 30107, and Execute.
69. Press Keys CL, 00123 00006, and Execute.
70. Press Keys CL, 00125 00004, and Execute.
71. Press Keys CL, 00126 00123, and Execute.
72. Press Read AGC, Keys CL, 0122, and Execute. Verify REG SEL display of 0011 000 001 000 111.
73. Press Keys CL, 0123, and Execute. Verify REG SEL display of 0000 000 000 000 110.
74. Press Keys CL, 0125, and Execute. Verify REG SEL display of 0000 000 000 000 100.
75. Press Keys CL, 0126, and Execute. Verify REG SEL display of 0000 000 001 010 011.
76. Press Transfer Control, Keys CL, 0122, and Execute.
77. Set T12 OFF and press Proceed.
78. Using oscilloscope, measure the one level at pin 305 of Logic module A04 (signal INOUT). Record on data sheet.
79. Set T12 ON, ALGA OFF and STRT1/STRT2 to OFF.
80. Press Keyboard Load and press CL, 00013, and 02000.
81. Press CHANNEL and EXECUTE.
82. Press Keys CL, 00000, and 00000.
83. Press EXECUTE.
84. Press TRANSFER CONTROL, Keys CL, and 0000.
85. Press EXECUTE.
86. Set T12 OFF and Press Proceed.
87. Press STBY pushbutton on DSKY until STBY indicator turns ON.
88. Using oscilloscope (with Type W plug in unit) measure the one level of signal GOJAM at pin 261 of Logic module A02. Record on data sheet.
89. Set STRT1/STRT2 switch ON.
90. Press STBY pushbutton on DSKY until STBY indicator turns OFF.
91. Set T12 ON and press PROCEED.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC
NO. 05392
REV. -
INITIAL TDRR 32541

JOB: LOGIC SIGNAL MEASUREMENTS

ASSEMBLY UNDER TEST

TITLE Apollo Guidance Computer

SER. NO. ______ DWG. ______ REV. ____

TEST HISTORY

DATE ______ START ______ END ______ SITE/LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________________ SER. NO. ______ ______ CAL DATE

NAME ________________ SER. NO. ______ ______ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

B. PROCEDURE		Results	Limits
5.	A02/130 ($\overline{\mathrm{CT}}$)	______	0.87 to 1.20 vdc
7.	A01/165	______	0.87 to 1.20 vdc
8.	A01/302 (F18AX)	______	0.87 to 1.20 vdc
	A02/219 (P04)	______	0.87 to 1.20 vdc
	A24/256 ($\overline{\mathrm{SBO}}$)	______	0.87 to 1.20 vdc
	A02/342 (T04)	______	0.87 to 1.20 vdc
	A02/309 (T11)	______	0.87 to 1.20 vdc
12.	A02/261 (GOJAM)	______	0.87 to 1.20 vdc
	A03/206 (STRTFC)	______	0.87 to 1.20 vdc
15.	A61/403 (STRT2)	______	0.90 to 1.50 vdc
17.	A02/145 (Q2A)	______	2.8 to 3.8 vdc

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05392
REV. -

JOB: LOGIC SIGNAL MEASUREMENTS

B. PROCEDURE (Cont'd)

		Results	Limits
34.	A08/153 (G01)		0.87 to 1.20 vdc
	A08/127 ($\overline{\text{G01}}$)		0.87 to 1.20 vdc
	A08/253 (G02)		0.87 to 1.20 vdc
	A08/453 (G03)		0.87 to 1.20 vdc
	A08/359 ($\overline{\text{G04}}$)		0.87 to 1.20 vdc
	A11/159 ($\overline{\text{G13}}$)		0.87 to 1.20 vdc
	A11/259 ($\overline{\text{G14}}$)		0.87 to 1.20 vdc
	A11/459 ($\overline{\text{G15}}$)		0.87 to 1.20 vdc
	A11/359 ($\overline{\text{G16}}$)		0.87 to 1.20 vdc
	A08/159 ($\overline{\text{G05}}$)		0.87 to 1.20 vdc
	A09/259 ($\overline{\text{G06}}$)		0.87 to 1.20 vdc
	A09/459 ($\overline{\text{G07}}$)		0.87 to 1.20 vdc
	A09/359 ($\overline{\text{G08}}$)		0.87 to 1.20 vdc
	A10/159 ($\overline{\text{G09}}$)		0.87 to 1.20 vdc
	A10/259 ($\overline{\text{G10}}$)		0.87 to 1.20 vdc
	A10/459 ($\overline{\text{G11}}$)		0.87 to 1.20 vdc
	A10/359 ($\overline{\text{G12}}$)		0.87 to 1.20 vdc
	A12/220 ($\overline{\text{PC15}}$)		0.87 to 1.20 vdc

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05392
REV. -

JOB: LOGIC SIGNAL MEASUREMENTS

B. PROCEDURE (Cont'd)

		Results	Limits
34.	(Continued)		
	A10/465 (WL11)		0.87 to 1.20 vdc
	A14/334 (XB5)		0.87 to 1.20 vdc
	A14/332 (XB6)		0.87 to 1.20 vdc
	A14/346 (XB3)		0.87 to 1.20 vdc
52.	A06/165 (DVXP1)		0.87 to 1.20 vdc
	A04/210 (DV1)		0.87 to 1.20 vdc
	A03/343 ($\overline{\text{EXSTO}}$)		0.87 to 1.20 vdc
	A08/123 ($\overline{\text{L01}}$)		0.87 to 1.20 vdc
65.	A03/425 (MP1)		0.87 to 1.20 vdc
	A03/413 (MP3)		0.87 to 1.20 vdc
	A07/165 (WALSG)		0.87 to 1.20 vdc
78.	A04/305 (INOUT)		0.87 to 1.20 vdc
88.	A02/261 (GOJAM)		0.78 to 1.20 vdc

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05392
REV. -

JOB: LOGIC SIGNAL MEASUREMENTS

B. PROCEDURE (Cont'd)

		Results	Limits
34.	A08/153 (G01)	______	0.87 to 1.20 vdc
	A08/127 ($\overline{\text{G01}}$)	______	0.87 to 1.20 vdc
	A08/253 (G02)	______	0.87 to 1.20 vdc
	A08/453 (G03)	______	0.87 to 1.20 vdc
	A08/359 ($\overline{\text{G04}}$)	______	0.87 to 1.20 vdc
	A11/159 ($\overline{\text{G13}}$)	______	0.87 to 1.20 vdc
	A11/259 ($\overline{\text{G14}}$)	______	0.87 to 1.20 vdc
	A11/459 ($\overline{\text{G15}}$)	______	0.87 to 1.20 vdc
	A11/359 ($\overline{\text{G16}}$)	______	0.87 to 1.20 vdc
	A08/159 ($\overline{\text{G05}}$)	______	0.87 to 1.20 vdc
	A09/259 ($\overline{\text{G06}}$)	______	0.87 to 1.20 vdc
	A09/459 ($\overline{\text{G07}}$)	______	0.87 to 1.20 vdc
	A09/359 ($\overline{\text{G08}}$)	______	0.87 to 1.20 vdc
	A10/159 ($\overline{\text{G09}}$)	______	0.87 to 1.20 vdc
	A10/259 ($\overline{\text{G10}}$)	______	0.87 to 1.20 vdc
	A10/459 ($\overline{\text{G11}}$)	______	0.87 to 1.20 vdc
	A10/359 ($\overline{\text{G12}}$)	______	0.87 to 1.20 vdc
	A12/220 ($\overline{\text{PC15}}$)	______	0.87 to 1.20 vdc

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05392
REV. -

JOB: LOGIC SIGNAL MEASUREMENTS

B. PROCEDURE (Cont'd)

		Results	Limits
34.	(Continued)		
	A10/465 (WL11)	______	0.87 to 1.20 vdc
	A14/334 (XB5)	______	0.87 to 1.20 vdc
	A14/332 (XB6)	______	0.87 to 1.20 vdc
	A14/346 (XB3)	______	0.87 to 1.20 vdc
52.	A06/165 (DVXP1)	______	0.87 to 1.20 vdc
	A04/210 (DV1)	______	0.87 to 1.20 vdc
	A03/343 ($\overline{\text{EXSTO}}$)	______	0.87 to 1.20 vdc
	A08/123 ($\overline{\text{L01}}$)	______	0.87 to 1.20 vdc
65.	A03/425 (MP1)	______	0.87 to 1.20 vdc
	A03/413 (MP3)	______	0.87 to 1.20 vdc
	A07/165 (WALSG)	______	0.87 to 1.20 vdc
78.	A04/305 (INOUT)	______	0.87 to 1.20 vdc
88.	A02/261 (GOJAM)	______	0.78 to 1.20 vdc

DATE ________

JOB: DSKY TEST DATA

SUBSYSTEM: Apollo Guidance Computer

DESCRIPTION:

JDC: 05393 REV: A PAGE 1 OF 3

INITIAL TDRR 32541 D.S. PGS. 3

ASSY:

Record of DSKY test data.

(M)

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	5/18/67	33805	1,2,3	1,2,3	[illegible]	[illegible]

REFERENCES:

PS 2016007
PS 2016015

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

None Required.

DATE________

JOB: DSKY TEST DATA

SUBSYSTEM: Apollo Guidance Computer

JDC: 05393 REV: A PAGE 2 OF 3

ASSY:

B. PROCEDURE

1. Bring forward from test records the following test data which was obtained with the DSKY test station:

   (a) Actual and average intensity of the following six (6) segments on each DSKY:

   PROG
   NOUN
   VERB
   3 Horizontal Bars

   (b) Intensity of COMP ACTY segment on each DSKY.

   (c) Actual and average intensity of the six (6) segments of the left PROG character positions on each DSKY. These segments are:

   72J
   71F
   22K
   16B
   34K
   31E

   (d) Actual and average intensity of all key E.L.'s on each DSKY.

   (e) Actual and average intensity of six (6) alarm segments after the indicated correction factor has been added to each intensity measurement for each DSKY:

Segment	Correction Factor (Foot-Lamberts)
NO ATT	2.3
STBY	2.0
UPLINK ACTY	4.0
TEMP	2.0
PROG	1.9
RESTART	3.2

DATE________

JOB: DSKY TEST DATA

SUBSYSTEM: Apollo Guidance Computer

JDC: 05393 REV: A PAGE 3 OF 3

ASSY:

B. PROCEDURE (Cont'd)

2. Verify that each DSKY has been tested with the DSKY test station per PS 2003994 without any indication of failure. Stamp data sheet.

3. Verify that DSKY modules were inspected for mechanical defects during assembly. Stamp data sheet.

4. Verify test results from PS 2003994 are included in data package.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC
NO. 05393
REV. A
INITIAL TDRR 32:41

JOB: DSKY TEST DATA

ASSEMBLY UNDER TEST

TITLE Apollo Guidance Computer
SER. NO. ________ DWG. ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE/LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ CAL DATE
NAME ________ SER. NO. ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

		Results DSKY #1		Results DSKY #2
B. PROCEDURE				
1. Record				
(a) Average intensity of six segments on		______AV.		______AV.
PROG	______		______	
NOUN	______		______	
VERB	______		______	
3 Horizontal Bars	______		______	
	______		______	
	______		______	
(b) Intensity of COMP ACTY segment		______AV.		______AV.
(c) Average intensity of six segments on left PROG character		______AV.		______AV.
72J	______		______	
71F	______		______	
22K	______		______	
16B	______		______	
34K	______		______	
31E	______		______	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05393
REV. A

JOB: DSKY TEST DATA

B. PROCEDURE (Cont'd)

	Results DSKY #1	Results DSKY #2
(d) Average intensity of all 19 key E.L.'s	______AV.	______AV
0	______	______
1	______	______
2	______	______
3	______	______
4	______	______
5	______	______
6	______	______
7	______	______
8	______	______
9	______	______
+	______	______
-	______	______
VERB	______	______
NOUN	______	______
CLR	______	______
STBY	______	______
KEY REL	______	______
ENTR	______	______
RSET	______	______

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05393
REV. A

JOB: DSKY TEST DATA

B. PROCEDURE (Cont'd)		Results DSKY #1		Results DSKY #2
(e) Average intensity of six alarm segments		______AV.		______AV.
NO ATT	______		______	
STBY	______		______	
UPLINK ACTY	______		______	
TEMP	______		______	
PROG	______		______	
RESTART	______		______	

2. Each DSKY has been tested per PS 2003994 without any indication of failure ______ ______ Testman's Stamp

3. DSKY Modules have no evidence of mechanical defects as verified from previous inspection records. ______ ______ Testman's Stamp

4. DSKY test results of PS 2003994 in data package ______ ______ Testman's Stamp

DATE ______

JOB: DSKY TEST DATA

JDC: 05393 **REV:** B **PAGE** 1 **OF** 3

INITIAL TDRR 32541 **DS PGS** 1

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

Record of DSKY test data.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5/18/67	33805	1,2,3	1,2,3	[illegible]	[illegible]
B	3-11-68	35871	ALL	ALL	[illegible]	[illegible]

REFERENCES:

PS 2016007
PS 2016015

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

None Required.

DATE ________

JOB: DSKY TEST DATA

JDC: 05393 **REV:** B **PAGE** 2 **OF** 3

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

*1. Verify that each DSKY has been tested with the DSKY test station per PS 2003994 without any indication of failure. Stamp data sheet.

*2. Verify that DSKY modules were inspected for mechanical defects during assembly. Stamp data sheet.

*3. Verify test results from PS 2003994 are included in data package.

*NOTE: Steps 1, 2 & 3 are to be performed prior to Vibration Tests.

**Step 4 is to be performed after Thermal Tests.

DATE ________

JOB: DSKY TEST DATA

JDC: 05393 **REV:** B **PAGE** 3 **OF** 3

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE

**4. Measure and record the following data per the requirements of PS 2003994.

a. Actual and average intensity of the following six (6) segments on each DSKY:

PROG
NOUN
VERB
3 Horizontal Bars

b. Intensity of COMP ACTY segment on each DSKY.

c. Actual and average intensity of the six (6) segments of the left PROG character positions on each DSKY. These segments are:

72J
71F
22K
16B
34K
31E

d. Actual and average intensity of all key E.L.'s on each DSKY.

e. Actual and average intensity of all alarm segments.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

JDC
NO. 05393
REV. B
INITIAL TDRR 32541

JOB: DSKY TEST DATA

ASSEMBLY UNDER TEST

TITLE Apollo Guidance Computer

SER. NO. ________ **DWG.** ________ **REV.** ________

TEST HISTORY

DATE ________ START ________ END ________ SITE/LOCATION

TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ **SER. NO.** ________ CAL DATE

NAME ________ **SER. NO.** ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION **APPROVED BY** ________ NAME/AFFILIATION

B. PROCEDURE

4. Measure and Record

		Results DSKY #1		Results DSKY #2
(a) Average intensity of six segments on		______AV.		______AV.
PROG	______		______	
NOUN	______		______	
VERB	______		______	
3 Horizontal Bars	______		______	
	______		______	
	______		______	
(b) Intensity of COMP ACTY segment		______AV.		______AV.
(c) Average intensity of six segments on left PROG character		______AV.		______AV.
72J	______		______	
71F	______		______	
22K	______		______	
16B	______		______	
34K	______		______	
31E	______		______	

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05393
REV. B

JOB: DSKY TEST DATA

B. PROCEDURE (Cont'd)

	Results DSKY #1	Results DSKY #2
(d) Average intensity of all 19 key E.L.'s	______AV.	______AV
0	______	______
1	______	______
2	______	______
3	______	______
4	______	______
5	______	______
6	______	______
7	______	______
8	______	______
9	______	______
+	______	______
-	______	______
VERB	______	______
NOUN	______	______
CLR	______	______
STBY/PRO	______	______
KEY REL	______	______
ENTR	______	______
RSET	______	______

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05393
REV. B

JOB: DSKY TEST DATA

B. PROCEDURE (Cont'd)

	Results DSKY #1	Results DSKY #2
(e) Average intensity of alarm segments	______AV.	______AV.
UPLINK ACTY	______	______
NO ATT	______	______
STBY/PRO	______	______
KEY REL	______	______
OPR ERR	______	______
TEMP	______	______
GIMBAL LOCK	______	______
PROG	______	______
RESTART	______	______
TRACKER	______	______
1. Each DSKY has been tested per PS 2003994 without any indication of failure	______	______ Testman's Stamp
2. DSKY Modules have no evidence of mechanical defects as verified from previous inspection records	______	______ Testman's Stamp
3. DSKY test results of PS 2003994 in data package	______	______ Testman's Stamp

DATE ________

JOB: DSKY TEST DATA

JDC: 05393 REV: - PAGE __ OF 3

INITIAL TDRR 32541 D.S. PGS. 2

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

Record of DSKY test data.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES:

PS 2016007

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

None Required.

DATE ________

JOB: DSKY TEST DATA

JDC: 05393 REV: - PAGE 2 OF 3

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE

1. Record the following test data which was obtained with the DSKY test station:

   (a) Average intensity of the following six (6) segments on each DSKY:

   PROG
   NOUN
   VERB
   3 Horizontal Bars

   (b) Intensity of COMP ACTY segment on each DSKY.

   (c) Average intensity of the six (6) segments of the left PROG character positions on each DSKY. These segments are:

   72J
   71F
   22K
   16B
   34K
   31E

   (d) Average intensity of all key E.L.'s on each DSKY.

   (e) Average intensity of six (6) alarm segments after the indicated correction factor has been added to each intensity measurement for each DSKY:

Segment	Correction Factor (Foot-Lamberts)
NO ATT	2.3
STBY	2.0
UPLINK ACTY	4.0
TEMP	2.0
PROG	1.9
RESTART	3.2

DATE ________

JOB: DSKY TEST DATA

JDC: 05393 REV: - PAGE 3 OF 3

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

2. Verify that each DSKY has been tested with the DSKY test station without any indication of failure. Stamp data sheet.

3. Verify that DSKY modules were inspected for mechanical defects during assembly. Stamp data sheet.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

JDC
NO. 05393
REV. -
INITIAL TDRR 32541

JOB: DSKY TEST DATA

ASSEMBLY UNDER TEST

TITLE Apollo Guidance Computer

SER. NO. ________ DWG. ________ REV. ________

TEST HISTORY

DATE ________ START ________ END ________ SITE/LOCATION

TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ ________ CAL DATE

NAME ________ SER. NO. ________ ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

B. PROCEDURE

	Results DSKY #1	Results DSKY #2
1. Record		
(a) Average intensity of six segments on	________	________
PROG		
NOUN		
VERB		
3 Horizontal Bars		
(b) Intensity of COMP ACTY segment	________	________
(c) Average intensity of six segments on left PROG character	________	________
72J 71F 22K 16B 34K 31E		

DATE ________

JOB: DSKY TEST DATA

JDC: 05393 REV: - PAGE 1 OF 3

INITIAL TDRR 32541 D.S. PGS. 2

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

Record of DSKY test data.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES:

PS 2016007

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

None Required.

DATE________

JOB: DSKY TEST DATA

JDC: 05393 REV: - PAGE 2 OF 3

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE

1. Record the following test data which was obtained with the DSKY test station:

   (a) Average intensity of the following six (6) segments on each DSKY:

   PROG
   NOUN
   VERB
   3 Horizontal Bars

   (b) Intensity of COMP ACTY segment on each DSKY.

   (c) Average intensity of the six (6) segments of the left PROG character positions on each DSKY. These segments are:

   72J
   71F
   22K
   16B
   34K
   31E

   (d) Average intensity of all key E.L.'s on each DSKY.

   (e) Average intensity of six (6) alarm segments after the indicated correction factor has been added to each intensity measurement for each DSKY:

Segment	Correction Factor (Foot-Lamberts)
NO ATT	2.3
STBY	2.0
UPLINK ACTY	4.0
TEMP	2.0
PROG	1.9
RESTART	3.2

DATE________

JOB: DSKY TEST DATA

JDC: 05393 REV: - PAGE 3 OF 3

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

2. Verify that each DSKY has been tested with the DSKY test station without any indication of failure. Stamp data sheet.

3. Verify that DSKY modules were inspected for mechanical defects during assembly. Stamp data sheet.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

JDC
NO. 05393
REV. -
INITIAL TDRR 32541

JOB: DSKY TEST DATA

ASSEMBLY UNDER TEST

TITLE Apollo Guidance Computer

SER. NO. ______ DWG. ______ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE/LOCATION

TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________ SER. NO. ______ CAL DATE

NAME ____________ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

B. PROCEDURE	Results DSKY #1	Results DSKY #2
1. Record		
(a) Average intensity of six segments on	____	____
PROG		
NOUN		
VERB		
3 Horizontal Bars		
(b) Intensity of COMP ACTY segment	____	____
(c) Average intensity of six segments on left PROG character	____	____
72J		
71F		
22K		
16B		
34K		
31E		

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 2
JOB: DSKY TEST DATA

JDC
NO. 05193
REV. __

B. PROCEDURE (Cont'd)	Results DSKY #1	Results DSKY #2	
(d) Average intensity of all key E.L.'s	______	______	
(e) Average intensity of six alarm segments	______	______	
NO ATT			
STBY			
UPLINK ACTY			
TEMP			
PROG			
RESTART			
2. Each DSKY has been tested without any indication of failure	______	______	Testman's Stamp
3. DSKY Modules have no evidence of mechanical defects	______	______	Testman's Stamp

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 2
JOB: DSKY TEST DATA

DC
NO. 05193
REV. -

B. PROCEDURE (Cont'd)

	Results DSKY #1	Results DSKY #2	
(d) Average intensity of all key E.L.'s	______	______	
(e) Average intensity of six alarm segments	______	______	
NO ATT			
STBY			
UPLINK ACTY			
TEMP			
PROG			
RESTART			
2. Each DSKY has been tested without any indication of failure	______	______	Testman's Stamp
3. DSKY Modules have no evidence of mechanical defects	______	______	Testman's Stamp

DATE ________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 **REV:** A **PAGE** 1 **OF** 6
INITIAL TDRR 32541 **D.S. PGS** 1

SUBSYSTEM: Apollo Guidance Computer
ASSY:

DESCRIPTION:

To determine the Computer's susceptibility when 50 volt spikes (transients) are applied to the 28V power leads.

(M)

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	3-2-67	33124	1, 3, 4	1	[illegible]	[illegible]

REFERENCES:

PS 2016007

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Set the Transient Voltage Tester switches as follows:
   - a. Main power switch OFF.
   - b. TRANSIENT switch OFF.
   - c. PULSE switch to + 28V LINE.
2. Set the Transient Voltage Tester Power Supply switches as follows:
   - a. AC switch ON.
   - b. DC switch OFF.
3. Set the Transient Voltage Tester Pulse Generator switches as follows:
   - a. POWER switch ON.
   - b. REPETITION RATE to 10 CPS.
   - c. PULSE DELAY to 5 microsecs.
   - d. PULSE WIDTH to 5 microsecs.
   - e. POLARITY to +.
   - f. ATTENUATOR to 20 db.

DATE________

JOB: TRANSIENT VOLTAGE TEST **JDC:** 05394 **REV:** A **PAGE** 2 **OF** 6

SUBSYSTEM: Apollo Guidance Computer **ASSY:**

A. PREPARATION (Cont'd)

4. Plug in the Transient Voltage Tester and turn on the Main Power switch.

CAUTION: A potential difference will exist between the Transient Voltage Tester chassis, the oscilloscope chassis, and the Operations Console Chassis.

5. Plug in the Oscilloscope and turn on the Power switch. A TYPE CA PLUG-IN UNIT is required. An isolation plug must be used.
6. Turn the Transient Voltage Tester Power Supply DC switch ON.
7. Perform JDC 05343 (Equipment Set-Up).
8. Perform JDC 05344 (Equipment Power Turn-On).
9. Perform JDC 05345 (Computer Turn-On).

B. PROCEDURE

1. Connect a test lead between the SCOPE MONITOR DIFF jack on the Transient Voltage Tester and the FREQ A AC jack on the CTS Frequency Counter.
2. Turn the TRANSIENT switch ON.
3. Adjust the REPETITION RATE VERNIER for a pulse rate of 10.0 ± 0.1 pps.
4. Disconnect the test lead between the SCOPE MONITOR DIFF jack and the Frequency Counter.
5. Set the Scope controls as follows:
   - a. MODE switch to added ALGEBRAICALLY.
   - b. Both VOLTS/CM switches to 20.
   - c. Channel A POLARITY to NORMAL.
   - d. Channel B POLARITY to INVERTED.
   - e. TRIGGER mode to EXT +.
   - f. TIME/CM switch to 5 microsecs.

DATE________

JOB: TRANSIENT VOLTAGE TEST **JDC:** 05394 **REV:** A **PAGE** 3 **OF** 6

SUBSYSTEM: Apollo Guidance Computer **ASSY:**

B. PROCEDURE (Cont'd)

6. Connect a test lead between the Scope TRIGGER INPUT jack and the Pulse Generator POSITIVE SYNC, OUTPUT jack.
7. Connect a test lead between the Scope CHANNEL A Input jack and the SCOPE MONITOR DIFF + jack.
8. Connect a test lead between the Scope CHANNEL B Input jack and the SCOPE MONITOR DIFF - jack.
9. Adjust the Transient Voltage Tester Power Supply voltage for a pulse output of 50 ± 2V.
10. Measure and record the following pulse characteristics:
    - a. Amplitude 50 ± 2V
    - b. Rise Time 10 to 90% of leading edge NMT 1.0 usec.
    - c. Pulse Width at 5 volt level 10.0 ± 4.0 usec
11. Turn the TRANSIENT switch OFF.
12. Press MAIN DSKY ALARM KB OFF.
13. Press NAV DSKY ALARM KB OFF.
14. Press AGC OFF.
15. Disconnect P5 of the W227 cable from J5 of the Operations Console.
16. Plug the Transient Voltage Tester cable into J5 of the Operations Console.
17. Plug P5 of the W227 cable into the Transient Voltage Tester cable.
18. Press AGC ON.

DATE________

JOB: TRANSIENT VOLTAGE TEST **JDC:** 05394 **REV:** A **PAGE** 4 **OF** 6

SUBSYSTEM: Apollo Guidance Computer **ASSY:**

B. PROCEDURE (Cont'd)

19. Press MAIN DSKY ALARM KB ON.
20. Press NAV DSKY ALARM KB ON.
21. Turn TRANSIENT switch ON.
23. Measure and record the following pulse characteristics for reference:
    - a. Amplitude
    - b. Pulse Width at 5 volt level
    - c. Rise Time 10 to 90% of leading edge
24. Turn TRANSIENT switch OFF.
25. Execute Program NEWSPEAK as specified in JDC 05376 steps A1-B149 except A5.
26. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.
27. During the 15 seconds success display set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.
28. Set the TRANSIENT switch to ON.
29. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.
30. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.
31. Set ALGA ON.
32. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

DATE________

JOB: TRANSIENT VOLTAGE TEST | JDC: 05394 REV: A PAGE 5 OF 6

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

33. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

34. Set the PULSE switch to 28V RET.

35. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.

36. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.

37. Set ALGA ON.

38. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

39. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

40. Set the TRANSIENT switch to OFF.

41. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.

42. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.

43. Set ALGA ON.

44. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

45. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

46. Set the PULSE switch to + 28V LINE.

47. Turn the Transient Voltage Tester Power Supply DC switch OFF.

48. Turn the Transient Voltage Tester Main Power switch OFF.

DATE________

JOB: TRANSIENT VOLTAGE TEST | JDC: 05394 REV A PAGE 6 OF 6

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

49. Press MAIN DSKY ALARM KB OFF.

50. Press NAV DSKY ALARM KB OFF.

51. Press AGC OFF.

52. Disconnect P5 of the W227 cable from the Transient Voltage Tester.

53. Disconnect the Transient Voltage Tester from J5 of the Operations Console.

54. Connect P5 of the W227 cable to J5 of the Operations Console.

55. Remove the W263 cable and replace the Interface cables.

56. Press AGC ON.

57. Press MAIN DSKY ALARM KB ON.

58. Press NAV DSKY ALARM KB ON.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05394
REV. A
INITIAL TDRR 32541

JOB: TRANSIENT VOLTAGE TEST

ASSEMBLY UNDER TEST
TITLE Apollo Guidance Computer
SER. NO. ______ DWG. ______ REV. ____

TEST HISTORY
DATE ______ START ______ END ______ SITE/LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE ______
NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION
APPROVED BY ______ NAME/AFFILIATION

B. PROCEDURE	Results	Limits
10. Pulse Characteristics		
a. Amplitude	______	50 ± 2V
b. Rise Time	______	NMT 1.0 usec
c. Pulse Width	______	NMT 10.0 ± 4.0 usec
22. Pulse Characteristics		
a. Amplitude	______	Reference
b. Rise Time	______	Reference
c. Pulse Width	______	Reference
25. No program deviation or malfunction evidenced	______	Testman's Stamp
31. No program deviation or malfunction evidenced	______	Testman's Stamp
37. No program deviation or malfunction evidenced	______	Testman's Stamp
43. No program deviation or malfunction evidenced	______	Testman's Stamp

DATE ______

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: B PAGE 1 OF 6

INITIAL TDRR 32541 D.S. PGS. 1

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

To determine the Computer's susceptibility when 50 volt spikes (transients) are applied to the 28V power leads.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
B	4-13-67	33586	All	1	[illegible]	[illegible]

REFERENCES:
PS 2016007
PS 2016015

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Set the Transient Voltage Tester switches as follows:
   - a. STATION power switch OFF.
   - b. TRANSIENT ON/OFF switch to OFF.
   - c. TRANSIENT +28/+28 RETURN to +28.
2. Set the Transient Voltage Tester Power Supply switches to ON.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: B PAGE 2 OF 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

A. PREPARATION (Cont'd)

3. Plug in the Transient Voltage Tester and turn on the STATION POWER switch.

CAUTION: A potential difference will exist between the Transient Voltage Tester chassis, the oscilloscope chassis, and the Operations Console Chassis.

4. Plug in the Oscilloscope and turn on the Power switch. A TYPE CA PLUG-IN UNIT is required. An isolation plug must be used.

B. PROCEDURE

1. Connect a test lead between the SCOPE MONITOR DIFF jack on the Transient Voltage Tester and the FREQ A-AC jack on the CTS Frequency Counter.
2. Turn the TRANSIENT ON/OFF switch to ON.
3. Turn on the Transient Voltage Tester Pulse Generator and adjust the controls for a pulse rate of 10.0 ± 0.5 pps.
4. Disconnect the test lead between the SCOPE MONITOR DIFF jack and the Frequency Counter.
5. Set the Scope controls as follows:
   - a. MODE switch to ADDED ALGEBRAICALLY.
   - b. Both VOLTS/CM switches to 20.
   - c. Channel A POLARITY to NORMAL.
   - d. Channel B POLARITY to INVERTED.
   - e. TRIGGER mode to EXT +.
   - f. TIME/CM switch to 5 microsecs.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: B PAGE 3 OF 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

6. Connect a test lead between the Scope TRIGGER INPUT jack and the Pulse Generator POSITIVE SYNC, OUTPUT jack.
7. Connect a test lead between the Scope CHANNEL A Input jack and the SCOPE MONITOR DIFF A jack.
8. Connect a test lead between the Scope CHANNEL B Input jack and the SCOPE MONITOR DIFF B jack.
9. Adjust the Transient Voltage Tester Power Supply voltage for a pulse output of 50 ± 2V.
10. Measure and record the following pulse characteristics:
    - a. Amplitude 50 ± 2V
    - b. Pulse Width at 5 volt level 10.0 ± 4.0 usec.
    - c. Rise Time 10 to 90% of leading edge NMT 1.0 usec.
11. Turn the TRANSIENT ON/OFF switch to OFF.
12. Press MAIN DSKY ALARM KB OFF.
13. Press NAV DSKY ALARM KB OFF.
14. Press AGC OFF.
15. Disconnect P5 of the W227 cable from J5 of the Operations Console.
16. Plug the Transient Voltage Tester cable into J5 of the Operations Console.
17. Plug P5 of the W227 cable into the Transient Voltage Tester cable.
18. Press AGC ON.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: B PAGE 4 OF 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

19. Press MAIN DSKY ALARM KB ON.
20. Press NAV DSKY ALARM KB ON.
21. Turn TRANSIENT ON/OFF switch to ON.
23. Measure and record the following pulse characteristics for reference:
    - a. Amplitude
    - b. Pulse Width at 5 volt level
    - c. Rise Time 10 to 90% of leading edge
24. Turn TRANSIENT ON/OFF switch to OFF.
25. Execute Program NEWSPEAK as specified in JDC 05376 steps A1-B149 except A5.
26. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.
27. During the 15 seconds success display set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.
28. Set the TRANSIENT ON/OFF switch to ON.
29. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.
30. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.
31. Set ALGA ON.
32. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

DATE________

JOB: TRANSIENT VOLTAGE TEST | JDC: 05394 REV: B PAGE 5 OF 6

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

33. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

34. Set the TRANSIENT +28/+28 RETURN switch to +28 RETURN.

35. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.

36. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.

37. Set ALGA ON.

38. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

39. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

40. Set the TRANSIENT ON/OFF switch to OFF.

41. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.

42. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.

43. Set ALGA ON.

44. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

45. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

46. Set the TRANSIENT +28/+28 RETURN switch to +28.

48. Turn the Transient Voltage Tester STATION POWER switch OFF.

DATE________

JOB: TRANSIENT VOLTAGE TEST | JDC: 05394 REV: B PAGE 6 OF 6

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

49. Press MAIN DSKY ALARM KB OFF.

50. Press NAV DSKY ALARM KB OFF.

51. Press AGC OFF.

52. Disconnect P5 of the W227 cable from the Transient Voltage Tester.

53. Disconnect the Transient Voltage Tester from J5 of the Operations Console.

54. Connect P5 of the W227 cable to J5 of the Operations Console.

55. Remove the W263 cable and replace the Interface cables.

56. Press AGC ON.

57. Press MAIN DSKY ALARM KB ON.

58. Press NAV DSKY ALARM KB ON.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05394
REV. B
INITIAL TDRR 32541

JOB: TRANSIENT VOLTAGE TEST

ASSEMBLY UNDER TEST	TEST HISTORY
TITLE Apollo Guidance Computer	DATE ____ START ____ END ____ SITE/LOCATION
SER. NO. ____ DWG. ____ REV. ____	TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

B. PROCEDURE	Results	Limits
10. Pulse Characteristics		
a. Amplitude	____	50 ± 2V
b. Pulse Width	____	10.0 ± 4.0 µsec
c. Rise Time	____	NMT 1.0 µsec
23. Pulse Characteristics		
a. Amplitude	____	Reference
b. Pulse Width	____	Reference
c. Rise Time	____	Reference
26. No program deviation or malfunction evidenced	____	Testman's Stamp
32. No program deviation or malfunction evidenced	____	Testman's Stamp
38. No program deviation or malfunction evidenced	____	Testman's Stamp
44. No program deviation or malfunction evidenced	____	Testman's Stamp

DATE ____

JOB: TRANSIENT VOLTAGE TEST
JDC: 05394 REV: C PAGE 1 OF 6
INITIAL TDRR 32541 DS. PGS. 1
SUBSYSTEM: Apollo Guidance Computer
ASSY:
DESCRIPTION:

To determine the Computer's susceptibility when 50 volt spikes (transients) are applied to the 28V power leads.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
B	4-13-67	33586	All	1		
C	5-4-67	33702	1,2,3,5, 6	1		

REFERENCES:
PS 2016007
PS 2016015

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Set the Transient Voltage Tester switches as follows:
   - a. STATION power switch OFF.
   - b. TRANSIENT ON/OFF switch to OFF.
   - c. TRANSIENT +28/+28 RETURN to +28.
2. Set the Transient Voltage Tester Power Supply switches to ON.

DATE ________

JOB: TRANSIENT VOLTAGE TEST
JDC: 05394 REV: C PAGE 2 OF 6
SUBSYSTEM: Apollo Guidance Computer
ASSY:

A. PREPARATION (Cont'd)

3. Plug in the Transient Voltage Tester and turn on the STATION POWER switch.

CAUTION: A potential difference will exist between the Transient Voltage Tester chassis, the oscilloscope chassis, and the Operations Console Chassis.

4. Plug in the Oscilloscope and turn on the Power switch. A TYPE CA PLUG-IN UNIT is required. An isolation plug must be used.

B. PROCEDURE

1. Connect a test lead between the SCOPE MONITOR DIFF "A" jack on the Transient Voltage Tester and the FREQ A-AC jack on the CTS Frequency Counter.
2. Turn the TRANSIENT ON/OFF switch to ON.
3. Turn on the Transient Voltage Tester Pulse Generator and adjust the controls for a pulse rate of 10.0 ± 0.5 pps.
4. Disconnect the test lead between the SCOPE MONITOR DIFF jack and the Frequency Counter.
5. Set the Scope controls as follows:
   - a. MODE switch to ADDED ALGEBRAICALLY.
   - b. Both VOLTS/CM switches to 20.
   - c. Channel A POLARITY to NORMAL.
   - d. Channel B POLARITY to INVERTED.
   - e. TRIGGER mode to EXT +.
   - f. TIME/CM switch to 5 microsecs.

DATE ________

JOB: TRANSIENT VOLTAGE TEST
JDC: 05394 REV: C PAGE 3 OF 6
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (Cont'd)

6. Connect a test lead between the Scope TRIGGER INPUT jack and the Pulse Generator TRIGGER OUTPUT jack, POLARITY switch+.
7. Connect a test lead between the Scope CHANNEL A Input jack and the SCOPE MONITOR DIFF A jack.
8. Connect a test lead between the Scope CHANNEL B Input jack and the SCOPE MONITOR DIFF B jack.
9. Adjust the Transient Voltage Tester Power Supply voltage for a pulse output of 50 ± 2V.
10. Measure and record the following pulse characteristics:
    - a. Amplitude 50 ± 2V
    - b. Pulse Width at 5 volt level 10.0 ± 4.0 usec.
    - c. Rise Time 10 to 90% of leading edge NMT 1.0 usec.
11. Turn the TRANSIENT ON/OFF switch to OFF.
12. Press MAIN DSKY ALARM KB OFF.
13. Press NAV DSKY ALARM KB OFF.
14. Press AGC OFF.
15. Disconnect P5 of the W227 cable from J5 of the Operations Console.
16. Plug the Transient Voltage Tester cable into J5 of the Operations Console.
17. Plug P5 of the W227 cable into the Transient Voltage Tester cable.
18. Press AGC ON.

DATE ________

JOB: TRANSIENT VOLTAGE TEST
JDC: 05394 REV: C PAGE 4 OF 6
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (Cont'd)

19. Press MAIN DSKY ALARM KB ON.
20. Press NAV DSKY ALARM KB ON.
21. Turn TRANSIENT ON/OFF switch to ON.
23. Measure and record the following pulse characteristics for reference:
    - a. Amplitude
    - b. Pulse Width at 5 volt level
    - c. Rise Time 10 to 90% of leading edge
24. Turn TRANSIENT ON/OFF switch to OFF.
25. Execute Program NEWSPEAK as specified in JDC 05376 steps A1-B149 except A5.
26. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.
27. During the 15 seconds success display set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.
28. Set the TRANSIENT ON/OFF switch to ON.
29. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.
30. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.
31. Set ALGA ON.
32. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

DATE ________

JOB: TRANSIENT VOLTAGE TEST | JDC: 05394 REV: C PAGE 5 OF 6

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

33. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

34. Press 28 VDC OFF.

35. Set the TRANSIENT +28/+28 RETURN switch to +28 RETURN.

36. Press 28 VDC ON. Insure NEWSPEAK PROGRAM is set up properly as stated in JDC 05376, steps A1-B149 except A5.

37. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.

38. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.

39. Set ALGA ON.

40. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

41. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

42. Press 28 VDC OFF.

43. Set the TRANSIENT ON/OFF switch to OFF.

44. Press 28 VDC ON. Insure NEWSPEAK PROGRAM is set up properly as stated in JDC 05376, steps A1-B149 except A5.

45. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.

46. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.

47. Set ALGA ON.

48. Allow PROGRAM NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

49. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

50. Turn the Transient Voltage Tester STATION POWER switch OFF.

51. Set the TRANSIENT +28/+28 RETURN switch to +28.

JOB: TRANSIENT VOLTAGE TEST | JDC: 05394 REV: C PAGE 6 OF 6

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

52. Press MAIN DSKY ALARM KB OFF.

53. Press NAV DSKY ALARM KB OFF.

54. Press AGC OFF.

55. Disconnect P5 of the W227 cable from the Transient Voltage Tester.

56. Disconnect the Transient Voltage Tester from J5 of the Operations Console.

57. Connect P5 of the W227 cable to J5 of the Operations Console.

58. Remove the W263 cable and replace the Interface cables.

59. Press AGC ON.

60. Press MAIN DSKY ALARM KB ON.

61. Press NAV DSKY ALARM KB ON.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05394
REV. C
INITIAL TDRR 32541

JOB: TRANSIENT VOLTAGE TEST

ASSEMBLY UNDER TEST
TITLE Apollo Guidance Computer
SER. NO. ______ DWG. ______ REV. ____

TEST HISTORY
DATE ______ (START) ______ (END) ______ (SITE/LOCATION)
TIME ______ (START) ______ (END) ______ (TOTAL ELAPSED)

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE ______
NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ (NAME/AFFILIATION) APPROVED BY ______ (NAME/AFFILIATION)

B. PROCEDURE	Results	Limits
10. Pulse Characteristics		
a. Amplitude	______	50 ± 2V
b. Pulse Width	______	10.0 ± 4.0 µsec
c. Rise Time	______	NMT 1.0 µsec
23. Pulse Characteristics		
a. Amplitude	______	Reference
b. Pulse Width	______	Reference
c. Rise Time	______	Reference
26. No program deviation or malfunction evidenced	______	Testman's Stamp
32. No program deviation or malfunction evidenced	______	Testman's Stamp
40. No program deviation or malfunction evidenced	______	Testman's Stamp
48. No program deviation or malfunction evidenced	______	Testman's Stamp

DATE ______

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: D PAGE 1 OF 6

INITIAL TDRR 32541 D.S. PGS. 1

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

To determine the Computer's susceptibility when 50 volt spikes (transients) are applied to the 28V power leads.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
B	4-13-67	33586	All	1	AMS FA	AMS FA
C	5-4-67	33702	1,2,3,5, 6	1	AMS FA	AMS FA
D	8-24-67	34452	1,5,6		AS FA	AS FA

REFERENCES:

PS 2016007
PS 2016015

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Set the Transient Voltage Tester switches as follows:
    - a. STATION power switch OFF.
    - b. TRANSIENT ON/OFF switch to OFF.
    - c. TRANSIENT +28/+28 RETURN to +28.
2. Set the Transient Voltage Tester Power Supply switches to ON.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: D PAGE 2 OF 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

A. PREPARATION (Cont'd)

3. Plug in the Transient Voltage Tester and turn on the STATION POWER switch.

CAUTION: A potential difference will exist between the Transient Voltage Tester chassis, the oscilloscope chassis, and the Operations Console Chassis.

4. Plug in the Oscilloscope and turn on the Power switch. A TYPE CA PLUG-IN UNIT is required. An isolation plug must be used.

B. PROCEDURE

1. Connect a test lead between the SCOPE MONITOR DIFF "A" jack on the Transient Voltage Tester and the FREQ A-AC jack on the CTS Frequency Counter.
2. Turn the TRANSIENT ON/OFF switch to ON.
3. Turn on the Transient Voltage Tester Pulse Generator and adjust the controls for a pulse rate of 10.0 ± 0.5 pps.
4. Disconnect the test lead between the SCOPE MONITOR DIFF jack and the Frequency Counter.
5. Set the Scope controls as follows:
    - a. MODE switch to ADDED ALGEBRAICALLY.
    - b. Both VOLTS/CM switches to 20.
    - c. Channel A POLARITY to NORMAL.
    - d. Channel B POLARITY to INVERTED.
    - e. TRIGGER mode to EXT +.
    - f. TIME/CM switch to 5 microsecs.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: D PAGE 3 OF 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

6. Connect a test lead between the Scope TRIGGER INPUT jack and the Pulse Generator TRIGGER OUTPUT jack, POLARITY switch+.
7. Connect a test lead between the Scope CHANNEL A Input jack and the SCOPE MONITOR DIFF A jack.
8. Connect a test lead between the Scope CHANNEL B Input jack and the SCOPE MONITOR DIFF B jack.
9. Adjust the Transient Voltage Tester Power Supply voltage for a pulse output of 50 ± 2V.
10. Measure and record the following pulse characteristics:
    - a. Amplitude 50 ± 2V
    - b. Pulse Width at 5 volt level 10.0 ± 4.0 usec.
    - c. Rise Time 10 to 90% of leading edge NMT 1.0 usec.
11. Turn the TRANSIENT ON/OFF switch to OFF.
12. Press MAIN DSKY ALARM KB OFF.
13. Press NAV DSKY ALARM KB OFF.
14. Press AGC OFF.
15. Disconnect P5 of the W227 cable from J5 of the Operations Console.
16. Plug the Transient Voltage Tester cable into J5 of the Operations Console.
17. Plug P5 of the W227 cable into the Transient Voltage Tester cable.
18. Press AGC ON.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV D PAGE 4 OF 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

19. Press MAIN DSKY ALARM KB ON.
20. Press NAV DSKY ALARM KB ON.
21. Turn TRANSIENT ON/OFF switch to ON.
23. Measure and record the following pulse characteristics for reference:
    - a. Amplitude
    - b. Pulse Width at 5 volt level
    - c. Rise Time 10 to 90% of leading edge
24. Turn TRANSIENT ON/OFF switch to OFF.
25. Execute Program NEWSPEAK as specified in JDC 05376 steps A1-B149 except A5.
26. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.
27. During the 15 seconds success display set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.
28. Set the TRANSIENT ON/OFF switch to ON.
29. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.
30. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.
31. Set ALGA ON.
32. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

DATE________

JOB: TRANSIENT VOLTAGE TEST
JDC: 05394 REV: D PAGE 5 OF 6
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (Cont'd)

33. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

34. Press AGC OFF.

35. Press MAIN DSKY ALARMS KB OFF.

36. Press NAV DSKY ALARMS KB OFF.

37. Press Console 28 VDC OFF.

38. Set the TRANSIENT +28/+28 RETURN switch to +28 RETURN.

39. Press Console 28 VDC ON. MAIN and NAV DSKY ALARMS KB ON and AGC ON. Perform NEWSPEAK Program as stated in JDC 05376, steps A1-B149 except A5.

40. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

41. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

42. Press AGC OFF.

43. Press MAIN ALARMS KB OFF.

44. Press NAV ALARMS KB OFF.

45. Press Console 28 VDC OFF.

46. Set the TRANSIENT ON/OFF switch to OFF.

47. Press Console 28 VDC ON. MAIN and NAV ALARMS KB ON and AGC ON. Perform NEWSPEAK PROGRAM as stated in JDC 05376, steps A1-B149 except A5.

DATE__________

JOB: TRANSIENT VOLTAGE TEST
JDC: 05394 REV: D PAGE 6 OF 6
SUBSYSTEM: Apollo Guidance Computer
ASSY:

B. PROCEDURE (Cont'd)

48. Allow PROGRAM NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

49. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

50. Press MAIN DSKY ALARM KB OFF.

51. Press NAV DSKY ALARM KB OFF.

52. Press AGC OFF and Console 28 VDC OFF.

53. Turn the Transient Voltage Tester STATION POWER switch OFF.

54. Set the TRANSIENT +28/+28 RETURN switch to +28.

55. Disconnect P5 of the W227 cable from the Transient Voltage Tester.

56. Disconnect the Transient Voltage Tester from J5 of the Operations Console.

57. Connect P5 of the W227 cable to J5 of the Operations Console.

58. Remove the W263 cable and replace the Interface cables.

59. Press Console 28 VDC and AGC ON.

60. Press MAIN DSKY ALARM KB ON.

61. Press NAV DSKY ALARM KB ON.

62. Turn the MAIN REGISTER and NAV REGISTER potentiometers fully counterclockwise.

63. Press OFF CH33-10.

DATE__________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05394
REV. D
INITIAL TDRR 32541

JOB: TRANSIENT VOLTAGE TEST

ASSEMBLY UNDER TEST
TITLE Apollo Guidance Computer
SER. NO. ______ DWG. ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE/LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

B. PROCEDURE	Results	Limits
10. Pulse Characteristics		
a. Amplitude	______	50 ± 2V
b. Pulse Width	______	10.0 ± 4.0 µsec
c. Rise Time	______	NMT 1.0 µsec
23. Pulse Characteristics		
a. Amplitude	______	Reference
b. Pulse Width	______	Reference
c. Rise Time	______	Reference
26. No program deviation or malfunction evidenced	______	Testman's Stamp
32. No program deviation or malfunction evidenced	______	Testman's Stamp
40. No program deviation or malfunction evidenced	______	Testman's Stamp
48. No program deviation or malfunction evidenced	______	Testman's Stamp

DATE ______

JDC: 05394 REV: - PAGE: 1 OF 6

JOB: TRANSIENT VOLTAGE TEST

INITIAL TDRR 32541 D.S. PGS. 1

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

To determine the Computer's susceptibility when 50 volt spikes (transients) are applied to the 28V power leads.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES:

PS 2016007

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Set the Transient Voltage Tester switches as follows:
    - a. Main power switch OFF.
    - b. TRANSIENT switch OFF.
    - c. PULSE switch to + 28V LINE.
2. Set the Transient Voltage Tester Power Supply switches as follows:
    - a. AC switch ON.
    - b. DC switch OFF.
3. Set the Transient Voltage Tester Pulse Generator switches as follows:
    - a. POWER switch ON.
    - b. REPETITION RATE to 10 CPS.
    - c. PULSE DELAY to 5 microsecs.
    - d. PULSE WIDTH to 5 microsecs.
    - e. POLARITY to +.
    - f. ATTENUATOR to 20 db.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: - PAGE 2 OF 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

A. PREPARATION (Cont'd)

4. Plug in the Transient Voltage Tester and turn on the Main Power switch.

CAUTION: A potential difference will exist between the Transient Voltage Tester chassis, the oscilloscope chassis, and the Operations Console Chassis.

5. Plug in the Oscilloscope and turn on the Power switch. A TYPE CA PLUG-IN UNIT is required. An isolation plug must be used.
6. Turn the Transient Voltage Tester Power Supply DC switch ON.
7. Perform JDC 05343 (Equipment Set-Up).
8. Perform JDC 05344 (Equipment Power Turn-On).
9. Perform JDC 05345 (Computer Turn-On).

B. PROCEDURE

1. Connect a test lead between the SCOPE MONITOR DIFF jack on the Transient Voltage Tester and the FREQ A AC jack on the CTS Frequency Counter.
2. Turn the TRANSIENT switch ON.
3. Adjust the REPETITION RATE VERNIER for a pulse rate of 10.0 ± 0.1 pps.
4. Disconnect the test lead between the SCOPE MONITOR DIFF jack and the Frequency Counter.
5. Set the Scope controls as follows:
    - a. MODE switch to added ALGEBRAICALLY.
    - b. Both VOLTS/CM switches to 20.
    - c. Channel A POLARITY to NORMAL.
    - d. Channel B POLARITY to INVERTED.
    - e. TRIGGER mode to EXT +.
    - f. TIME/CM switch to 5 microsecs.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: - PAGE 3 OF 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

6. Connect a test lead between the Scope TRIGGER INPUT jack and the Pulse Generator POSITIVE SYNC, OUTPUT jack.
7. Connect a test lead between the Scope CHANNEL A Input jack and the SCOPE MONITOR DIFF + jack.
8. Connect a test lead between the Scope CHANNEL B Input jack and the SCOPE MONITOR DIFF - jack.
9. Adjust the Transient Voltage Tester Power Supply voltage for a pulse output of 50 ± 2V.
10. Measure and record the following pulse characteristics:
    - a. Amplitude 50 ± 2V
    - b. Pulse Width at 5 volt level NMT 1.0 msec.
    - c. Rise Time 10 to 90% of leading edge NMT 1.0 usec.
11. Turn the TRANSIENT switch OFF.
12. Press MAIN DSKY ALARM KB OFF.
13. Press NAV DSKY ALARM KB OFF.
14. Press AGC OFF.
15. Disconnect P5 of the W227 cable from J5 of the Operations Console.
16. Plug the Transient Voltage Tester cable into J5 of the Operations Console.
17. Plug P5 of the W227 cable into the Transient Voltage Tester cable.
18. Press AGC ON.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: - PAGE 4 OF 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

19. Press MAIN DSKY ALARM KB ON.
20. Press NAV DSKY ALARM KB ON.
21. Turn TRANSIENT switch ON.
22. Adjust the Transient Voltage Tester Power Supply voltage for a pulse output of 50 ± 2V.
23. Measure and record the following pulse characteristics:
    - a. Amplitude 50 ± 2V
    - b. Pulse Width at 5 volt level 10.0 ± 4.0 usec
    - c. Rise Time 10 to 90% of leading edge NMT 1.0 usec.
24. Turn TRANSIENT switch OFF.
25. Execute Program NEWSPEAK as specified in JDC 05376 steps A1-B149 except A5.
26. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.
27. During the 15 seconds success display set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.
28. Set the TRANSIENT switch to ON.
29. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.
30. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.
31. Set ALGA ON.
32. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: - PAGE 1 OF 6

INITIAL TDRR 32541 DS PGS 1

SUBSYSTEM: Apollo Guidance Computer

ASSY:

DESCRIPTION:

To determine the Computer's susceptibility when 50 volt spikes (transients) are applied to the 28V power leads.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES:

PS 2016007

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PREPARATION

1. Set the Transient Voltage Tester switches as follows:
    - a. Main power switch OFF.
    - b. TRANSIENT switch OFF.
    - c. PULSE switch to + 28V LINE.
2. Set the Transient Voltage Tester Power Supply switches as follows:
    - a. AC switch ON.
    - b. DC switch OFF.
3. Set the Transient Voltage Tester Pulse Generator switches as follows:
    - a. POWER switch ON.
    - b. REPETITION RATE to 10 CPS.
    - c. PULSE DELAY to 5 microsecs.
    - d. PULSE WIDTH to 5 microsecs.
    - e. POLARITY to +.
    - f. ATTENUATOR to 20 db.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: - PAGE 2 OF 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

A. PREPARATION (Cont'd)

4. Plug in the Transient Voltage Tester and turn on the Main Power switch.

CAUTION: A potential difference will exist between the Transient Voltage Tester chassis, the oscilloscope chassis, and the Operations Console Chassis.

5. Plug in the Oscilloscope and turn on the Power switch. A TYPE CA PLUG-IN UNIT is required. An isolation plug must be used.
6. Turn the Transient Voltage Tester Power Supply DC switch ON.
7. Perform JDC 05343 (Equipment Set-Up).
8. Perform JDC 05344 (Equipment Power Turn-On).
9. Perform JDC 05345 (Computer Turn-On).

B. PROCEDURE

1. Connect a test lead between the SCOPE MONITOR DIFF jack on the Transient Voltage Tester and the FREQ A AC jack on the CTS Frequency Counter.
2. Turn the TRANSIENT switch ON.
3. Adjust the REPETITION RATE VERNIER for a pulse rate of 10.0 ± 0.1 pps.
4. Disconnect the test lead between the SCOPE MONITOR DIFF jack and the Frequency Counter.
5. Set the Scope controls as follows:
    - a. MODE switch to added ALGEBRAICALLY.
    - b. Both VOLTS/CM switches to 20.
    - c. Channel A POLARITY to NORMAL.
    - d. Channel B POLARITY to INVERTED.
    - e. TRIGGER mode to EXT +.
    - f. TIME/CM switch to 5 microsecs.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: - PAGE 3 OF 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

6. Connect a test lead between the Scope TRIGGER INPUT jack and the Pulse Generator POSITIVE SYNC, OUTPUT jack.
7. Connect a test lead between the Scope CHANNEL A Input jack and the SCOPE MONITOR DIFF + jack.
8. Connect a test lead between the Scope CHANNEL B Input jack and the SCOPE MONITOR DIFF - jack.
9. Adjust the Transient Voltage Tester Power Supply voltage for a pulse output of 50 ± 2V.
10. Measure and record the following pulse characteristics:
    - a. Amplitude 50 ± 2V
    - b. Pulse Width at 5 volt level NMT 1.0 msec.
    - c. Rise Time 10 to 90% of leading edge NMT 1.0 usec.
11. Turn the TRANSIENT switch OFF.
12. Press MAIN DSKY ALARM KB OFF.
13. Press NAV DSKY ALARM KB OFF.
14. Press AGC OFF.
15. Disconnect P5 of the W227 cable from J5 of the Operations Console.
16. Plug the Transient Voltage Tester cable into J5 of the Operations Console.
17. Plug P5 of the W227 cable into the Transient Voltage Tester cable.
18. Press AGC ON.

DATE________

JOB: TRANSIENT VOLTAGE TEST

JDC: 05394 REV: - PAGE 4 OF 6

SUBSYSTEM: Apollo Guidance Computer

ASSY:

B. PROCEDURE (Cont'd)

19. Press MAIN DSKY ALARM KB ON.
20. Press NAV DSKY ALARM KB ON.
21. Turn TRANSIENT switch ON.
22. Adjust the Transient Voltage Tester Power Supply voltage for a pulse output of 50 ± 2V.
23. Measure and record the following pulse characteristics:
    - a. Amplitude 50 ± 2V
    - b. Pulse Width at 5 volt level 10.0 ± 4.0 usec
    - c. Rise Time 10 to 90% of leading edge NMT 1.0 usec.
24. Turn TRANSIENT switch OFF.
25. Execute Program NEWSPEAK as specified in JDC 05376 steps A1-B149 except A5.
26. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.
27. During the 15 seconds success display set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.
28. Set the TRANSIENT switch to ON.
29. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.
30. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.
31. Set ALGA ON.
32. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

DATE________

B. PROCEDURE (Cont'd)

33. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

34. Set the PULSE switch to 28V RET.

35. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.

36. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.

37. Set ALGA ON.

38. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

39. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

40. Set the TRANSIENT switch to OFF.

41. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.

42. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.

43. Set ALGA ON.

44. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

45. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

46. Set the PULSE switch to + 28V LINE.

47. Turn the Transient Voltage Tester Power Supply DC switch OFF.

48. Turn the Transient Voltage Tester Main Power switch OFF.

DATE________

B. PROCEDURE (Cont'd)

49. Press MAIN DSKY ALARM KB OFF.

50. Press NAV DSKY ALARM KB OFF.

51. Press AGC OFF.

52. Disconnect P5 of the W227 cable from the Transient Voltage Tester.

53. Disconnect the Transient Voltage Tester from J5 of the Operations Console.

54. Connect P5 of the W227 cable to J5 of the Operations Console.

55. Remove the W263 cable and replace the Interface cables.

56. Press AGC ON.

57. Press MAIN DSKY ALARM KB ON.

58. Press NAV DSKY ALARM KB ON.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05394
REV. -
INITIAL TDRR 32511

JOB: TRANSIENT VOLTAGE TEST

ASSEMBLY UNDER TEST
TITLE Apollo Guidance Computer
SER. NO. ________ DWG. ________ REV. ____

TEST HISTORY
DATE ________ ________ ________
START END SITE/LOCATION
TIME ________ ________ ________
START END TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ________________ SER. NO. ________ CAL DATE
NAME ________________ SER. NO. ________ CAL DATE

CONDUCTED BY ________________ APPROVED BY ________________
NAME/AFFILIATION NAME/AFFILIATION

B. PROCEDURE	Results	Limits
10. Pulse Characteristics		
a. Amplitude	______	50 ± 2V
b. Rise Time	______	NMT 1.0 usec
c. Pulse Width	______	NMT 1.0 msec
23. Pulse Characteristics		
a. Amplitude	______	50 ± 2V
b. Rise Time	______	NMT 1.0 usec
c. Pulse Width	______	10.0 ± 4.0 usec
26. No program deviation or malfunction evidenced	______	Testman's Stamp
32. No program deviation or malfunction evidenced	______	Testman's Stamp
38. No program deviation or malfunction evidenced	______	Testman's Stamp
44. No program deviation or malfunction evidenced	______	Testman's Stamp

DATE________

JOB: TRANSIENT VOLTAGE TEST | JDC: 05394 REV: - PAGE 5 OF 6

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

33. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

34. Set the PULSE switch to 28V RET.

35. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.

36. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.

37. Set ALGA ON.

38. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

39. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

40. Set the TRANSIENT switch to OFF.

41. Press TRANSFER CONTROL, CL, 4463 and EXECUTE.

42. Press Monitor. Set INHIBIT INCREMENTS, INHIBIT INTERRUPT and T12 switches OFF. Press PROCEED.

43. Set ALGA ON.

44. Allow Program NEWSPEAK to operate for two (2) complete cycles. Verify that no failures occur. Record on data sheet.

45. During the 15 second success display, set ALGA OFF. Set T12 ON. Set INHIBIT INCREMENTS and INHIBIT INTERRUPT switches ON.

46. Set the PULSE switch to + 28V LINE.

47. Turn the Transient Voltage Tester Power Supply DC switch OFF.

48. Turn the Transient Voltage Tester Main Power switch OFF.

DATE ________

JOB: TRANSIENT VOLTAGE TEST | JDC: 05394 REV: - PAGE 6 OF 6

SUBSYSTEM: Apollo Guidance Computer | ASSY:

B. PROCEDURE (Cont'd)

49. Press MAIN DSKY ALARM KB OFF.

50. Press NAV DSKY ALARM KB OFF.

51. Press AGC OFF.

52. Disconnect P5 of the W227 cable from the Transient Voltage Tester.

53. Disconnect the Transient Voltage Tester from J5 of the Operations Console.

54. Connect P5 of the W227 cable to J5 of the Operations Console.

55. Remove the W263 cable and replace the Interface cables.

56. Press AGC ON.

57. Press MAIN DSKY ALARM KB ON.

58. Press NAV DSKY ALARM KB ON.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05394
REV. -
INITIAL TDRR 32541

JOB: TRANSIENT VOLTAGE TEST

ASSEMBLY UNDER TEST	**TEST HISTORY**
TITLE Apollo Guidance Computer	DATE ____ START ____ END ____ SITE/LOCATION
SER. NO. ____ DWG. ____ REV. ____	TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________ SER. NO. ____ CAL DATE ____
NAME ____________ SER. NO. ____ CAL DATE ____

CONDUCTED BY ____________ (NAME/AFFILIATION) APPROVED BY ____________ (NAME/AFFILIATION)

B. PROCEDURE	Results	Limits
10. Pulse Characteristics		
a. Amplitude	______	50 ± 2V
b. Rise Time	______	NMT 1.0 usec
c. Pulse Width	______	NMT 1.0 msec
23. Pulse Characteristics		
a. Amplitude	______	50 ± 2V
b. Rise Time	______	NMT 1.0 usec
c. Pulse Width	______	10.0 ± 4.0 usec
26. No program deviation or malfunction evidenced	______	Testman's Stamp
32. No program deviation or malfunction evidenced	______	Testman's Stamp
38. No program deviation or malfunction evidenced	______	Testman's Stamp
44. No program deviation or malfunction evidenced	______	Testman's Stamp

DATE ________

JOB: CONTINUITY AND HIPOT TESTS
JDC: 05395 **REV:** - **PAGE** 1 **OF** 5
INITIAL TDRR 33044 **D.S. PGS.** 1
SUBSYSTEM: Test Connector Assembly
ASSY:
DESCRIPTION:

Continuity and Hipot tests of Test Connector Assembly.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES:
FTM 1003230

IMPORTANT:

INTERVAL: As Required

TOOLS AND MATERIAL:
Test Station 1303

A. PREPARATION

1. Assure previous operation has been completed and assembly inspection tag has been stamped. Record on data sheet.

2. Assure that test equipment calibration is not overdue. Record on data sheet.

3. Connect the Test Connector Assembly for test to the appropriate pickup cables. See Figure 1.

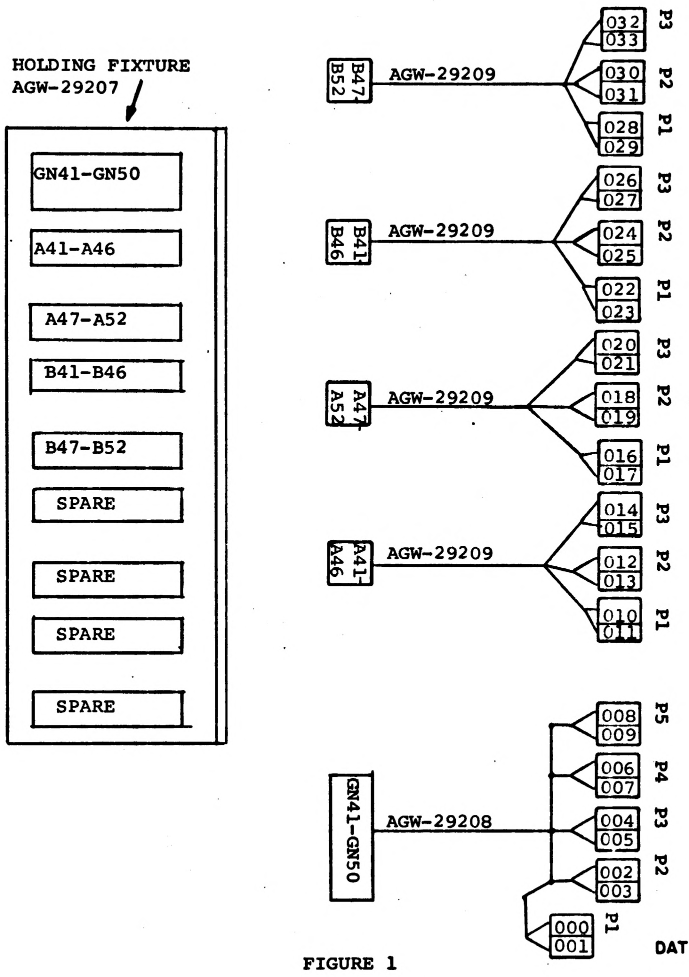
4. Insure that the connector inserts are properly oriented.

   Example: "A" on pickup cable to "A" on Ass'y under test.

5. Connect the other end of the pickup cables to their appropriately marked female receptacle on the connector rack. See Figure 1.

DATE________

JOB: CONTINUITY AND HIPOT TESTS
JDC: 05395 **REV:** - **PAGE** 2 **OF** 5
SUBSYSTEM: Test Connector Assembly
ASSY:



DATE________

FIGURE 1

CONNECTOR ASSEMBLY

JOB: CONTINUITY AND HIPOT TESTS
JDC: 05395 **REV:** - **PAGE** 3 OF 5
SUBSYSTEM: Test Connector Assembly
ASSY:

A. PREPARATION (Cont'd)

6. Turn on Procedure.

   a. Depress "ON" switch.

   b. Place MODE switch to "STOP ON REJECT".

   c. Place Multiple Test switch to "0".

   d. Depress DWELL TIME BY PASS switch.

   e. Insure that SWITCHING MODULE DISCONNECT lights are out. If any light is on, it can be turned off by placing the HIGH VOLTAGE switch, located in upper left hand corner of the switching module, to the ON position.

   f. Place the FRIDEN power switch to ON.

   g. Place the SEL/ALL PUNCH switch to OFF.

   h. Select the following parameters on the OVERRIDE PANEL.

	VALUE	MULT
CONTINUITY CURRENT	0.5	---
CONTINUITY RESISTANCE	4	1
FAULT VOLTAGE	500V	---
INSULATION RESISTANCE	3	10M
DWELL TIME	3	0.1

   i. Depress the CONTINUOUS OVERRIDE switches that are associated with the above parameters.

DATE________

JOB: CONTINUITY AND HIPOT TESTS
JDC: 05395 **REV:** - **PAGE** 4 **OF** 5
SUBSYSTEM: Test Connector Assembly
ASSY:

A. PREPARATION (Cont'd)

   j. If the test tape is on the reel, the spooler power switch should be in the ON position. If the test tape is not on a reel, the spooler power switch should be in the OFF position.

   k. Insure that all other switches are in the "OFF" position.

B. PROCEDURE

1. Observe the identification information which has been assigned to the Assembly under test (see attached card).

2. Select the master test tape which has the same information.

3. Insure that read head is in the UP position. Use adjacent power switch.

4. Physically locate the first block of the test tape on the head of the tape reader. The eighth (8th) column bit or carriage return character should be used to identify the first line of the initial (or any) test block. This should be aligned with the black dot on the right hand side of the tape head.

5. Turn ON reader head power.

6. Push the reader STEP REVERSE switch until the first block of the tape information can be seen on the left hand side of the reader head. Push the reader STEP FORWARD switch till the first block of tape information is located directly under the reader head.

7. Depress the RUN switch.

8. Read the information which is printed out on the FRIDEN.

   Example:

a. COMP ASSY b. CONN. ASSY c. PRINT NUMBER 1003230	Where and how the Assembly is used, also the number assigned to the board, and the print number.

DATE________

B. PROCEDURE (Cont'd)

9. Depress RUN switch.

10. If an error is found, the FRIDEN will print out the error and the 610 will stop.

11. The test has been completed when the FRIDEN prints E-END-TEST--.

12. Test Connector Assembly tests performed with no indication of failure. Record on data sheet.

13. Turn OFF read head power.

14. Remove master test tape from reader head.

15. Remove Assembly from test fixture.

DATE________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05395
REV. -
INITIAL TDRR 33044

JOB: CONTINUITY AND HIPOT TESTS

ASSEMBLY UNDER TEST
TITLE Test Connector Assembly
SER. NO. ________ DWG. ________ REV. ____

TEST HISTORY
DATE ________ START ________ END ________ SITE/LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ________________ SER. NO. ________ ________ CAL DATE
NAME ________________ SER. NO. ________ ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION
APPROVED BY ________ NAME/AFFILIATION

	Test Data Card #	CHECK ONE YES	CHECK ONE NO
A. PREPARATION			
1. Assembly inspection tag signed	1	☐	☐
2. Calibration not overdue	2	☐	☐
B. PROCEDURE			
12. Continuity and Hipot Tests performed with no indication of failure	3	☐	☐

DATE________

JOB: CONNECTOR VISUAL INSPECTION

JDC: 05396 REV: - PAGE 1 OF 1

INITIAL TDRR 33044 D.S. PGS. 1

SUBSYSTEM: Test Connector Assembly

DESCRIPTION:

ASSY:

Final Visual Inspection

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES:

FTM 1003230

IMPORTANT:

INTERVAL:

TOOLS AND MATERIAL:

A. PROCEDURE

1. Assure that all prior tests and inspections have been completed. Record on data sheet.
2. Assure that connector pins are not misaligned or contaminated consistent with standards of good workmanship. Record on data sheet.
3. Verify that quantity of hardware is proper per the applicable assembly drawing. Record on data sheet.
4. Verify that nomenclature, drawing number, serial number, and other markings are correct and legible. Record on data sheet.
5. Assure that potting has no blistering, that potting is adhering, and has no other obvious defects.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05396
REV. -
INITIAL TDRR 33044

JOB: CONNECTOR VISUAL INSPECTION

ASSEMBLY UNDER TEST

TITLE Test Connector Assembly

SER. NO. ________ DWG. ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE/LOCATION

TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ CAL DATE

NAME ________ SER. NO. ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION

APPROVED BY ________ NAME/AFFILIATION

	Test Data Card #	Results	Limits
1. All prior tests and inspections have been completed	1	________	Testman's Stamp
2. Connector pins not misaligned	2	________	Testman's Stamp
3. Quantity of hardware is proper per applicable assembly drawing	3	________	Testman's Stamp
4. Markings are correct and legible	4	________	Testman's Stamp
5. Potting has no blistering or other obvious defects	5	________	Testman's Stamp

DATE ________

JDC 05402 **REV.** A **PAGE** 1 **OF** 1
INITIAL TDRR 25824 **D.S. PGS.** 0

JOB PULSE COUNT

SUBSYSTEM Counter-Timer (CTS)

ASSY. 2014233-011

DESCRIPTION

Operating the counter-timer to count the number of pulses during a time interval

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	6-28-66	29858	1	-	MM	-

REFERENCES JDC 05420. Computer Measurements Co. Instruction Manual for Model 7893B Universal Counter-Timer.

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

NOTE: Power is applied to the counter per JDC 05420.

PREPARATION

1. Set the switches and controls on the counter as follows:

   a. Set the FUNCTION switch to the COUNT A position.

   b. Set the GATE switch to the OPEN position.

   c. Turn the DISPLAY control to the ∞ position.

   d. Set the A INPUT VOLTS RMS switch to position 102.

PROCEDURE

2. Connect signal to be counted to the FREQ A connector.

3. Select A INPUT VOLTS RMS position where TRIGGER LEVEL can be properly adjusted.

4. Set the TRIGGER LEVEL control to the center of the counting range.

5. The totalizing may be stopped by setting the GATE switch to the AUTO position.

6. The displayed count can be reset to zero by depressing the RESET pushbutton.

JDC 05402 REV. - PAGE 1 OF 1
INITIAL TDRR 25824 D.S. PGS 0

JOB PULSE COUNT

SUBSYSTEM Counter-Timer (CTS)

ASSY. 2014233-011

DESCRIPTION

Operating the counter-timer to count the number of pulses during a time interval

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA

REFERENCES
Computer Measurements Co. Instruction Manual for Model 7893B Universal Counter-Timer

IMPORTANT

INTERVAL

TOOLS AND MATERIAL

NOTE: Power is applied to the counter per JDC 05420.

PREPARATION

1. Set the switches and controls on the counter as follows:
   - a. Set the FUNCTION switch to the COUNT A position.
   - b. Set the GATE switch to the OPEN position.
   - c. Turn the DISPLAY control to the MAN position.
   - d. Set the A INPUT VOLTS RMS switch to position 102.

PROCEDURE

2. Connect signal to be counted to the FREQ A connector.

3. Select A INPUT VOLTS RMS position where TRIGGER LEVEL can be properly adjusted.

4. Set the TRIGGER LEVEL control to the center of the counting range.

5. The totalizing may be stopped by setting the GATE switch to the AUTO position.

6. The displayed count can be reset to zero by depressing the RESET pushbutton.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB KEYBOARD LOAD OPERATING PROCEDURE

JDC 05408 **REV.** - **PAGE** 1 **OF** 2

INITIAL TDRR 29857 **D.S. PGS** 0

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Procedure for loading data into the Computer using the Computer Test Set keyboard load mode.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

NOTE: All controls and indicators referenced in this procedure are on the Computer Test Set.

OPERATION

1. On the Logic Drawer No. 2 panel:

   a. Set the INHIBIT INTERRUPT switch to ON position.

   b. Set the COUNTER STOP T12 switch to the ON position and observe that the lamp illuminates.

   c. Set the INCREMENTS INHIBIT switch to the ON position.

2. On the Programmer and Monitor panel:

   a. Set the register select switch to the A position.

   b. Depress the KEYBOARD LOAD annunciator and observe that it illuminates.

   c. Depress the CL pushbutton and observe that RZ and REG SEL indicators are extinguished.

   d. Punch in the five digit octal address by depressing the keys corresponding to the digits in sequence from the highest order digit to the lower order digit. (For example, address 01377_8 is punched in by depressing keys 0, 1, 3, 7, and 7 in that order.)

   e. Observe that the binary equivalent of the octal address appears on the 15 low order bits of the RZ indicators.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB KEYBOARD LOAD OPERATING PROCEDURE **JDC** 05408 **REV** - **PAGE** 2 **OF** 2

SUBSYSTEM Computer **ASSY**

   f. Punch in the five digit octal data.

   g. Observe that the binary equivalent of the octal data appears on the 15 low order bits of the REG SEL indicator.

   h. Depress the EXECUTE pushbutton.

3. On the Logic Drawer No. 2 panel, observe that the INCREMENTS LINC lamp is illuminated.

4. On the Programmer and Monitor panel:

   a. Observe that the 15 low order bits of REG SEL agree with bits 16 and 14 through 1 of RG.

   b. Observe that the indications in RZ bit positions 13, 14, and 15 are the same as the EBK indicators.

5. On the Logic Drawer No. 2 panel, observe that the PARITY TO G lamp is illuminated when an even number of binary one's is contained in the binary equivalent of the octal data inserted in step 2. f.

DATE ______

JOB TRANSFER CONTROL OPERATING PROCEDURE	JDC 05412 REV. A PAGE 1 OF 2 INITIAL TDRR 29857 D.S. PGS -
SUBSYSTEM Computer	ASSY.

DESCRIPTION

Procedure for calling up the next instruction to be executed using the Computer Test Set transfer control mode.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	9-7-67	34518	2	-	EA	-

REFERENCES

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

NOTE: All controls and indicators referenced in this procedure are on the Computer Test Set.

OPERATION

1. On the Logic Drawer No. 2 panel:

   a. Set the INHIBIT INTERRUPT switch to the ON position.

   b. Set the COUNTER STOP T12 switch to the ON position and observe that the lamp illuminates.

   c. Set the INCREMENTS INHIBIT switch to the ON position.

2. On the Programmer and Monitor panel:

   a. Set the register select switch to the A position.

   b. Depress the TRANSFER CONTROL annunciator and observe that it illuminates.

   c. Depress the CL pushbutton and observe that the RZ and REG SEL indicators are extinguished.

   NOTE: Perform Erasable and Fixed Bank Load procedure and Transfer Control procedure when a bank address is used. Perform the Transfer Control procedure when no bank address is used.

ERASABLE AND FIXED BANK LOAD

3. Punch in the four digits of the bank register address by depressing the keys corresponding to the digits in sequence from the highest order digit to the lowest order digit. (For example, bank register address 0003_8 is punched in by depressing keys 0, 0, 0, and 3 in that order.)

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 28 JUN 66

JOB TRANSFER CONTROL OPERATING PROCEDURE	JDC 05412 REV A PAGE 2 OF 2
SUBSYSTEM Computer	ASSY

4. Observe that the binary equivalent of the octal address appears on the 12 low order bits of the RZ indicators.

5. Punch in five octal digits as shown in table I for the contents of the bank register. Enter the desired EBK setting into bits 9, 10, and 11, or FBK setting into bits 11, 12, 13, 14, and 15 of RA register.

Table I

E BANK	REG SEL A
00	00000
01	00400
02	01000
03	01400
04	04000
05	02400
06	03000
07	03400

F BANK	REG SEL A
00	00000
01	02000
02	04000
03	06000
04	10000
05	12000
06	14000
07	16000
10	20000
11	22000
12	24000
13	26000
14	30000
15	32000
16	34000
17	36000
20	40000
21	42000
22	44000
23	46000
24	50000
25	52000
26	54000
27	56000
30	60000

Table I (cont)

F BANK	REG SEL A
31	62000
32	64000
33	66000
34	70000
35	72000
36	74000
37	76000

6. Observe that the binary equivalent of the register content appears on the 15 low order bits of the REG SEL indicators.

7. Depress the EXECUTE pushbutton.

8. Observe that the EBK indicators appear the same as bit positions 9, 10, and 11 of the REG SEL indicators if bank register address 0003_8 was punched in during step 3.

9. Observe that the FBK indicators appear the same as bit positions 11, 12, 13, 14, and 15 of the REG SEL indicators if bank address 0004_8 was punched in during step 3.

10. Depress the CL pushbutton and observe that the RZ and REG SEL indicators are extinguished.

TRANSFER CONTROL

11. Punch in the four digit octal address by depressing the keys corresponding to the digits in sequence from the highest order digit to the lowest order digit. (For example, address 7155_8 is punched in by depressing keys 7, 1, 5, and 5 in that order.)

12. Observe that the binary equivalent of the octal address appears on the 12 low order bits of the RZ indicators.

13. Depress the EXECUTE pushbutton.

DATE 28 JUN 66

JOB TRANSFER CONTROL OPERATING PROCEDURE

JDC 05412 REV. B PAGE 1 OF 2
INITIAL TDRR 29857 D.S. PGS -

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Procedure for calling up the next instruction to be executed using the Computer Test Set transfer control mode.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA
A	9-7-67	34518	2	-	EA	-
B	10-20-67	34888	2	-	EA	-

REFERENCES

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

NOTE: All controls and indicators referenced in this procedure are on the Computer Test Set.

OPERATION

1. On the Logic Drawer No. 2 panel:

   a. Set the INHIBIT INTERRUPT switch to the ON position.

   b. Set the COUNTER STOP T12 switch to the ON position and observe that the lamp illuminates.

   c. Set the INCREMENTS INHIBIT switch to the ON position.

2. On the Programmer and Monitor panel:

   a. Set the register select switch to the A position.

   b. Depress the TRANSFER CONTROL annunciator and observe that it illuminates.

   c. Depress the CL pushbutton and observe that the RZ and REG SEL indicators are extinguished.

NOTE: Perform Erasable and Fixed Bank Load procedure and Transfer Control procedure when a bank address is used. Perform the Transfer Control procedure when no bank address is used.

ERASABLE AND FIXED BANK LOAD

3. Punch in the four digits of the bank register address by depressing the keys corresponding to the digits in sequence from the highest order digit to the lowest order digit. (For example, bank register address 0003_8 is punched in by depressing keys 0, 0, 0, and 3 in that order.)

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 28 JUN 66

JOB TRANSFER CONTROL OPERATING PROCEDURE

JDC 05412 REV B PAGE 2 OF 2

SUBSYSTEM Computer

ASSY

4. Observe that the binary equivalent of the octal address appears on the 12 low order bits of the RZ indicators.

5. Punch in five octal digits as shown in table I for the contents of the bank register. Enter the desired EBK setting into bits 9, 10, and 11, or FBK setting into bits 11, 12, 13, 14, and 15 of RA register.

Table I

E BANK	REG SEL A
00	00000
01	00400
02	01000
03	01400
04	02000
05	02400
06	03000
07	03400

F BANK	REG SEL A
00	00000
01	02000
02	04000
03	06000
04	10000
05	12000
06	14000
07	16000
10	20000
11	22000
12	24000
13	26000
14	30000
15	32000
16	34000
17	36000
20	40000
21	42000
22	44000
23	46000
24	50000
25	52000
26	54000
27	56000
30	60000
31	62000
32	64000
33	66000
34	70000
35	72000
36	74000
37	76000

6. Observe that the binary equivalent of the register content appears on the 15 low order bits of the REG SEL indicators.

7. Depress the EXECUTE pushbutton.

8. Observe that the EBK indicators appear the same as bit positions 9, 10, and 11 of the REG SEL indicators if bank register address 0003_8 was punched in during step 3.

9. Observe that the FBK indicators appear the same as bit positions 11, 12, 13, 14, and 15 of the REG SEL indicators if bank address 0004_8 was punched in during step 3.

10. Depress the CL pushbutton and observe that the RZ and REG SEL indicators are extinguished.

TRANSFER CONTROL

11. Punch in the four digit octal address by depressing the keys corresponding to the digits in sequence from the highest order digit to the lowest order digit. (For example, address 7155_8 is punched in by depressing keys 7, 1, 5, and 5 in that order.)

12. Observe that the binary equivalent of the octal address appears on the 12 low order bits of the RZ indicators.

13. Depress the EXECUTE pushbutton.

DATE 28 JUN 66

JOB TRANSFER CONTROL OPERATING PROCEDURE

JDC 05412 **REV.** - **PAGE** 1 **OF** 2

INITIAL TDRR 29857 **D.S. PGS** ____

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Procedure for calling up the next instruction to be executed using the Computer Test Set transfer control mode.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

NOTE: All controls and indicators referenced in this procedure are on the Computer Test Set.

OPERATION

1. On the Logic Drawer No. 2 panel:

   a. Set the INHIBIT INTERRUPT switch to the ON position.

   b. Set the COUNTER STOP T12 switch to the ON position and observe that the lamp illuminates.

   c. Set the INCREMENTS INHIBIT switch to the ON position.

2. On the Programmer and Monitor panel:

   a. Set the register select switch to the A position.

   b. Depress the TRANSFER CONTROL annunciator and observe that it illuminates.

   c. Depress the CL pushbutton and observe that the RZ and REG SEL indicators are extinguished.

NOTE: Perform Erasable and Fixed Bank Load procedure and Transfer Control procedure when a bank address is used. Perform the Transfer Control procedure when no bank address is used.

ERASABLE AND FIXED BANK LOAD

3. Punch in the four digits of the bank register address by depressing the keys corresponding to the digits in sequence from the highest order digit to the lowest order digit. (For example, bank register address 0003_8 is punched in by depressing keys 0, 0, 0, and 3 in that order.)

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ____

JOB TRANSFER CONTROL OPERATING PROCEDURE

JDC 05412 **REV** - **PAGE** 2 **OF** 2

SUBSYSTEM Computer

ASSY

4. Observe that the binary equivalent of the octal address appears on the 12 low order bits of the RZ indicators.

5. Punch in the five octal digits for the contents of the bank register.

6. Observe that the binary equivalent of the register content appears on the 15 low order bits of the REG SEL indicators.

7. Depress the EXECUTE pushbutton.

8. Observe that the EBK indicators appear the same as bit positions 1, 2, and 3 of the REG SEL indicators if bank register address 0003_8 was punched in during step 3.

9. Observe that the FBK indicators appear the same as bit positions 11, 12, 13, 14, and 15 of the REG SEL indicators if bank address 0004_8 was punched in during step 3.

10. Depress the CL pushbutton and observe that the RZ and REG SEL indicators are extinguished.

TRANSFER CONTROL

11. Punch in the four digit octal address by depressing the keys corresponding to the digits in sequence from the highest order digit to the lowest order digit. (For example, address 7155_8 is punched in by depressing keys 7, 1, 5, and 5 in that order.)

12. Observe that the binary equivalent of the octal address appears on the 12 low order bits of the RZ indicators.

13. Depress the EXECUTE pushbutton.

DATE ____

JOB PROGRAMMER AND MONITOR AND LOGIC DRAWER NO. 2 PANELS PRELIMINARY TEST SET-UP

JDC 05413 **REV.** A **PAGE** 1 **OF** 2

INITIAL TDRR 29857 **D.S. PGS** 0

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Initial switch settings and lamp indications for the Buffer Circuit Assembly Logic Drawer No. 2 panel, and Programmer and Monitor panel.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	10-27-66	31677	2	-	EA	-

REFERENCES

JDC 05420

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

NOTE: All controls and indicators referenced in this procedure are on the Computer Test Set.

PREPARATION

1. If the equipment is not energized, perform the Power Turn-On section of JDC 05420.

2. On the Buffer Circuit Assembly:

   a. Set the ALGA switch to the OFF position.

   b. Set the STRT1/STRT2 switch to the OFF position.

3. On the Logic Drawer No. 2 panel:

   a. Set the AGREEMENT A digiswitches to the X position and the sample selector switch to the OFF position.

   b. Set the AGREEMENT B digiswitches to the X position and the sample selector switch to the OFF position.

   c. Set the RG AGREEMENT digiswitches to the X position and the sample selector switch to the OFF position.

   d. Set the RG, RB, RX, RQ, RLP, and RY RECORD COMPARISON digiswitches to the X position.

   e. Set the INCREMENTS INHIBIT switch to the ON position.

   f. Set the TIMING INHIBIT switch to the OFF position.

   g. Set the INHIBIT INTERRUPT switch to the ON position.

   h. Set the COUNTER STOP T12 switch to the ON position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 28 JUN 66

JOB PROGRAMMER AND MONITOR AND LOGIC DRAWER NO. 2 PANELS PRELIMINARY TEST SET-UP

JDC 05413 **REV** A **PAGE** 2 **OF** 2

SUBSYSTEM Computer

ASSY

   i. Set the COUNTER STOP NISQ, RPTR, IIP, CTROR, INKL, and PARITY FAIL switches to the OFF position.

4. On the Programmer and Monitor panel:

   a. Set the TEST MODE switch to the SUBSYSTEM position.

   b. Set the register select switch to the A position.

OPERATION

5. Depress the PROCEED pushbutton on the Programmer and Monitor panel.

6. On the Logic Drawer No. 2 panel:

   a. Verify that the COUNTER STOP T12 indicator is illuminated.

   b. Verify that the COUNTER STOP NISQ, RPTR, IIP, CTROR, INKL, and PARITY FAIL indicators are extinguished.

   c. Verify that the INCREMENTS PINC, MINC, SHINC, SHANC, OINC, and LINC indicators are extinguished.

   d. Verify that the STPIT indicator is illuminated.

   NOTE: If INCREMENTS OINC, and LINK indicators light, press the PROCEED pushbutton on the CTS programmer and monitor panel until the indicators go out.

DATE 28 JUN 66

JOB PROGRAMMER AND MONITOR AND LOGIC DRAWER NO. 2 PANELS PRELIMINARY TEST SET-UP

JDC 05413 REV. B PAGE 1 OF 2
INITIAL TDRR 29857 D.S. PGS 0

SUBSYSTEM Computer
ASSY.

DESCRIPTION

Initial switch settings and lamp indications for the Buffer Circuit Assembly Logic Drawer No. 2 panel, and Programmer and Monitor panel.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	10-27-66	31677	2	-	EA	-
B	9-29-67	34760	2	-	EA	-

REFERENCES
JDC 05420

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

NOTE: All controls and indicators referenced in this procedure are on the Computer Test Set.

PREPARATION

1. If the equipment is not energized, perform the Power Turn-On section of JDC 05420.

2. On the Buffer Circuit Assembly:

a. Set the ALGA switch to the OFF position.

NOTE: Step 2.b is applicable when testing computer assembly 2003200 (-011 through -041) and 2003993-011. Disregard this step when testing computer assembly 2003993-021 and above.

b. Set the STRT1/STRT2 switch to the ON position.

3. On the Logic Drawer No. 2 panel:

a. Set the AGREEMENT A digiswitches to the X position and the sample selector switch to the OFF position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 28 JUN 66

JOB PROGRAMMER AND MONITOR AND LOGIC DRAWER NO. 2 PANELS PRELIMINARY TEST SET-UP

JDC 05413 REV B PAGE 2 OF 2

SUBSYSTEM Computer
ASSY

b. Set the AGREEMENT B digiswitches to the X position and the sample selector switch to the OFF position.

c. Set the RG AGREEMENT digiswitches to 777777 and the sample selector switch to the OFF position.

d. Set the RG, RB, RX, and RQ RECORD COMPARISON digiswitches to the X position, and RY digiswitch to 77777. Set RLP RECORD COMPARISON digiswitches to 00000.

e. Set the INCREMENTS INHIBIT switch to the ON position.

f. Set the TIMING INHIBIT switch to the OFF position.

g. Set the INHIBIT INTERRUPT switch to the ON position.

h. Set the COUNTER STOP T12 switch to the ON position.

i. Set the COUNTER STOP NISQ, RPTR, IIP, CTROR, INKL, and PARITY FAIL switches to the OFF position.

4. On the Programmer and Monitor panel:

a. Set the TEST MODE switch to the SUBSYSTEM position.

b. Set the register select switch to the A position.

c. Depress MONITOR annunciator.

OPERATION

5. Depress FRESH START, ALARM RESET, and PROCEED pushbuttons on the Programmer and Monitor panel.

6. On the Logic Drawer No. 2 panel:

a. Verify that the COUNTER STOP T12 indicator is illuminated.

b. Verify that the COUNTER STOP NISQ, RPTR, IIP, CTROR, INKL, and PARITY FAIL indicators are extinguished.

c. Verify that the INCREMENTS PINC, MINC, SHINC, SHANC, OINC, and LINC indicators are extinguished.

d. Verify that the STPIT indicator is illuminated.

DATE 28 JUN 66

JOB PROGRAMMER AND MONITOR AND LOGIC DRAWER NO. 2 PANELS PRELIMINARY TEST SET-UP

JDC 05413 **REV.** - **PAGE** 1 **OF** 2

INITIAL TDRR 25857 **D.S. PGS** 0

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Initial switch settings and lamp indications for the Buffer Circuit Assembly Logic Drawer No. 2 panel, and Programmer and Monitor panel.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA

REFERENCES

JDC 05420

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

NOTE: All controls and indicators referenced in this procedure are on the Computer Test Set.

PREPARATION

1. If the equipment is not energized, perform the Power Turn-On section of JDC 05420.

2. On the Buffer Circuit Assembly:

   a. Set the ALGA switch to the OFF position.

   b. Set the STRT1/STRT2 switch to the OFF position.

3. On the Logic Drawer No. 2 panel:

   a. Set the AGREEMENT A digiswitches to the X position and the sample selector switch to the OFF position.

   b. Set the AGREEMENT B digiswitches to the X position and the sample selector switch to the OFF position.

   c. Set the RG AGREEMENT digiswitches to the X position and the sample selector switch to the OFF position.

   d. Set the RG, RB, RX, RQ, RLP, and RY RECORD COMPARISON digiswitches to the X position.

   e. Set the INCREMENTS INHIBIT switch to the ON position.

   f. Set the TIMING INHIBIT switch to the OFF position.

   g. Set the INHIBIT INTERRUPT switch to the ON position.

   h. Set the COUNTER STOP T12 switch to the ON position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB PROGRAMMER AND MONITOR AND LOGIC DRAWER NO. 2 PANELS PRELIMINARY TEST SET-UP

JDC 05413 **REV** - **PAGE** 2 **OF** 2

SUBSYSTEM Computer

ASSY

   i. Set the COUNTER STOP NISQ, RPTR, IIP, CTROR, INKL, and PARITY FAIL switches to the OFF position.

4. On the Programmer and Monitor panel:

   a. Set the TEST MODE switch to the SUBSYSTEM position.

   b. Set the register select switch to the A position.

OPERATION

5. Depress the PROCEED pushbutton on the Programmer and Monitor panel.

6. On the Logic Drawer No. 2 panel:

   a. Verify that the COUNTER STOP T12 indicator is illuminated.

   b. Verify that the COUNTER STOP NISQ, RPTR, IIP, CTROR, INKL, and PARITY FAIL indicators are extinguished.

   c. Verify that the INCREMENTS PINC, MINC, SHINC, SHANC, OINC, and LINC indicators are extinguished.

   d. Verify that the STPIT indicator is illuminated.

DATE ______

JOB XY AND RDC INTERFACE PANELS PRELIMINARY TEST SET-UP
JDC 05414 REV. - PAGE 1 OF 2
INITIAL TDRR 29857 D.S. PGS 0
SUBSYSTEM Computer
ASSY.

DESCRIPTION

Initial switch settings and lamp indications for the XY and RDC Interface panels.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC 05420

IMPORTANT

INTERVAL
As required

TOOLS AND MATERIAL

NOTE: All controls and indicators referenced in this test are on the Computer Test Set.

PREPARATION

1. If the equipment is not energized, perform the Power Turn-On section of JDC 05420.

2. On the XY Interface panel:

   a. Set the SCOPE switch to the OFF position.

   b. Set the FREQ + PHASE switch to the OFF position.

   c. Set the OUT → IN switch to the OFF position.

   d. Set the Y MARGINS switch to the NORM position.

   e. Set the CHANNEL S switches to positions 100 and 1.

   f. Set the CHANNEL T switches to positions 100 and 1.

   g. Set the AGC INPUT COUNTERS switch to the 1 position.

   h. Deenergize all illuminated annunciators (except the MAIN DSKY and NAV DSKY annunciators) by depressing them.

3. Verify that the SCALER FREQ TEST annunciator on the Self Test panel is extinguished. Depress if illuminated.

4. On the RDC Interface panel:

   a. Set the HAND CONTROLLER switch to the 0 position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB XY AND RDC INTERFACE PANELS PRELIMINARY TEST SET-UP
JDC 05414 REV - PAGE 2 OF 2
SUBSYSTEM Computer
ASSY

   b. Set the CHANNEL V switches to positions 100 and 1.

   c. Set the CHV METERS switch to the OFF position.

   d. Set the DE MARGINS switch to the NORM position.

   e. Deenergize all illuminated annunciators by depressing them.

DATE ______

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 **REV.** A **PAGE** 1 **OF** 3
INITIAL TDRR 27956 **D.S. PGS** 0

SUBSYSTEM Computer
ASSY.

DESCRIPTION

Cable connections for GSE used during CSS test

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	10-13-66	31502	1,3	-	EA	-

REFERENCES

IMPORTANT

INTERVAL

TOOLS AND MATERIAL

1. Connect the Subsystem Test Interconnection Set (P/N 2014268-021) as shown on figure 1.

2. Connect cable W259 to the AGC Calibration System as follows:

   a. Connect plug P1 to the COMPUTER SIGNAL jack on the Control and Interface Panel of the AGC Calibration System.

   b. Connect plug P2 to the "+" jack on the Digital Ohmmeter.

   c. Connect plug P3 to the "-" jack on the Digital Ohmmeter.

3. Connect the antenna cable to the jack located on top of the AGC Calibration System.

4. On the Connector Plate Assembly (A20) of the Computer Test Set make the following cable connections starting with the top jack:

   a. Connect cable W244 from the CNTR A jack to the FREQ A DC jack on the frequency counter.

   b. Connect cable W243 from the CNTR B jack to the STOP B jack on the Frequency Counter.

   c. Connect cable W245 from the SCOPE A jack to the channel A 1 MEG jack on the Oscilloscope.

   d. Connect cable W246 from the SCOPE B jack to the channel B 1 MEG jack on the Oscilloscope.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 **REV** A **PAGE** 2 **OF** 3

SUBSYSTEM Computer
ASSY

e. Connect cable W247 from the EXT SYNC jack to the EXT TRIG jack on the Normal and Delaying Triggering section of the Oscilloscope.

f. Connect cable W240 from the SCOPE A jack to the SCOPE A jack on the XY Interface panel.

g. Connect cable W248 from the SCOPE B jack to the SCOPE B jack on the XY Interface panel.

h. Connect cable W249 from the CNTR A jack to the CNTR-A jack on the XY Interface panel.

i. Connect cable W250 from the CNTR B jack to the CNTR-B jack on the XY Interface panel.

j. Connect cable W251 from the EXT SYNC jack to the EXT SY-1 jack on the XY Interface panel.

k. Connect cable W252 from the A jack to the SIGNAL SELECT A jack on the Self Test panel.

l. Connect cable W253 from the B jack to the DAB jack on the Self Test panel.

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 **REV** A **PAGE** 3 **OF** 3

SUBSYSTEM Computer
ASSY

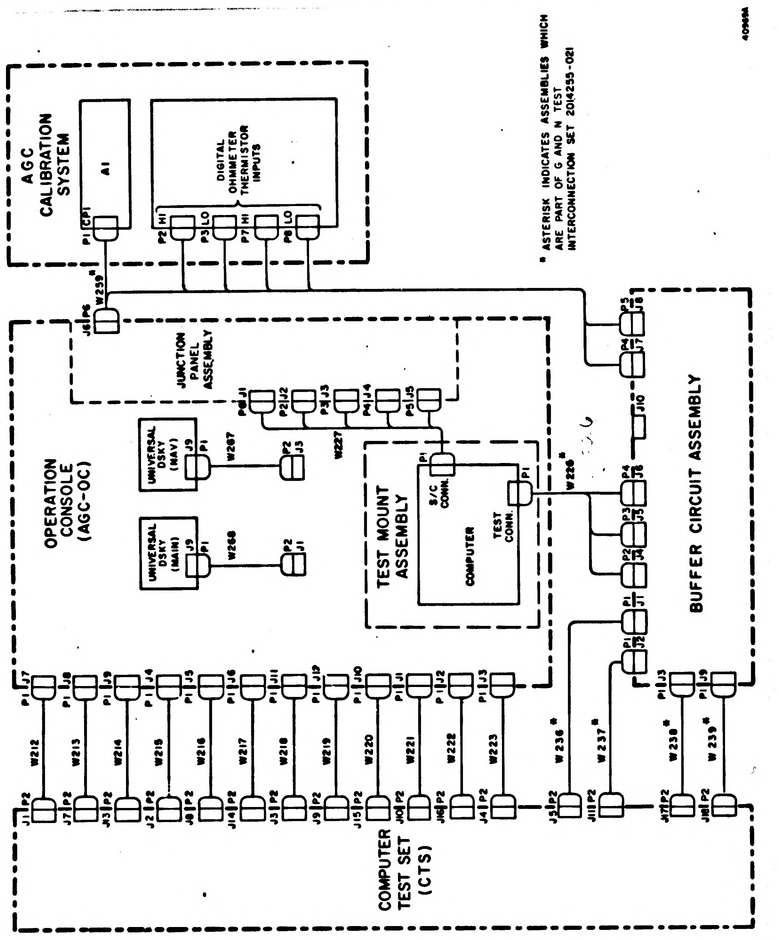

AGC CALIBRATION SYSTEM
A1
P1 CP1
DIGITAL OHMMETER THERMISTOR INPUTS
P2 HI
P3 LO
P7 HI
P8 LO
W259*
J6 P6
JUNCTION PANEL ASSEMBLY
P6 J1
P2 J2
P3 J3
P4 J4
P5 J5
W227
OPERATION CONSOLE (AGC-OC)
UNIVERSAL DSKY (NAV)
UNIVERSAL DSKY (MAIN)
J9 P1
W267
W268
P2 J3
P2 J1
TEST MOUNT ASSEMBLY
COMPUTER
S/C CONN.
TEST CONN.
P1
W226*
BUFFER CIRCUIT ASSEMBLY
P5 J8
P4 J7
J10
P4 J6
P3 J5
P2 J4
P1 J1
P1 J2
P1 J3
P1 J9
W212
W213
W214
W215
W216
W217
W218
W219
W220
W221
W222
W223
W236*
W237*
W238*
W239*
J1 P2
J7 P2
J13 P2
J2 P2
J8 P2
J14 P2
J3 P2
J9 P2
J15 P2
J10 P2
J16 P2
J4 P2
J5 P2
J11 P2
J17 P2
J18 P2
COMPUTER TEST SET (CTS)
* ASTERISK INDICATES ASSEMBLIES WHICH ARE PART OF G AND N TEST INTERCONNECTION SET 2014255-021
40969A

Figure 1. Subsystem Test Interconnections

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 REV. B PAGE 1 OF 3
INITIAL TDRR 27956 D.S. PGS 0

SUBSYSTEM Computer
ASSY.

DESCRIPTION

Cable connections for GSE used during CSS test

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	10-13-66	31502	1,3	-	EA	-
B	1-12-67	32648	1	-	EA	-

REFERENCES

IMPORTANT

INTERVAL

TOOLS AND MATERIAL

1. Connect the Subsystem Test Interconnection Set (Drawing No. 2014268) as shown on figure 1.

2. Connect cable W259 to the AGC Calibration System as follows:

   a. Connect plug P1 to the COMPUTER SIGNAL jack on the Control and Interface Panel of the AGC Calibration System.

   b. Connect plug P2 to the "+" jack on the Digital Ohmmeter.

   c. Connect plug P3 to the "-" jack on the Digital Ohmmeter.

3. Connect the antenna cable to the jack located on top of the AGC Calibration System.

4. On the Connector Plate Assembly (A20) of the Computer Test Set make the following cable connections starting with the top jack:

   a. Connect cable W244 from the CNTR A jack to the FREQ A DC jack on the frequency counter.

   b. Connect cable W243 from the CNTR B jack to the STOP B jack on the Frequency Counter.

   c. Connect cable W245 from the SCOPE A jack to the channel A 1 MEG jack on the Oscilloscope.

   d. Connect cable W246 from the SCOPE B jack to the channel B 1 MEG jack on the Oscilloscope.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 REV B PAGE 2 OF 3

SUBSYSTEM Computer
ASSY

   e. Connect cable W247 from the EXT SYNC jack to the EXT TRIG jack on the Normal and Delaying Triggering section of the Oscilloscope.

   f. Connect cable W240 from the SCOPE A jack to the SCOPE A jack on the XY Interface panel.

   g. Connect cable W248 from the SCOPE B jack to the SCOPE B jack on the XY Interface panel.

   h. Connect cable W249 from the CNTR A jack to the CNTR-A jack on the XY Interface panel.

   i. Connect cable W250 from the CNTR B jack to the CNTR-B jack on the XY Interface panel.

   j. Connect cable W251 from the EXT SYNC jack to the EXT SY-1 jack on the XY Interface panel.

   k. Connect cable W252 from the A jack to the SIGNAL SELECT A jack on the Self Test panel.

   l. Connect cable W253 from the B jack to the DAB jack on the Self Test panel.

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 REV B PAGE 3 OF 3

SUBSYSTEM Computer
ASSY

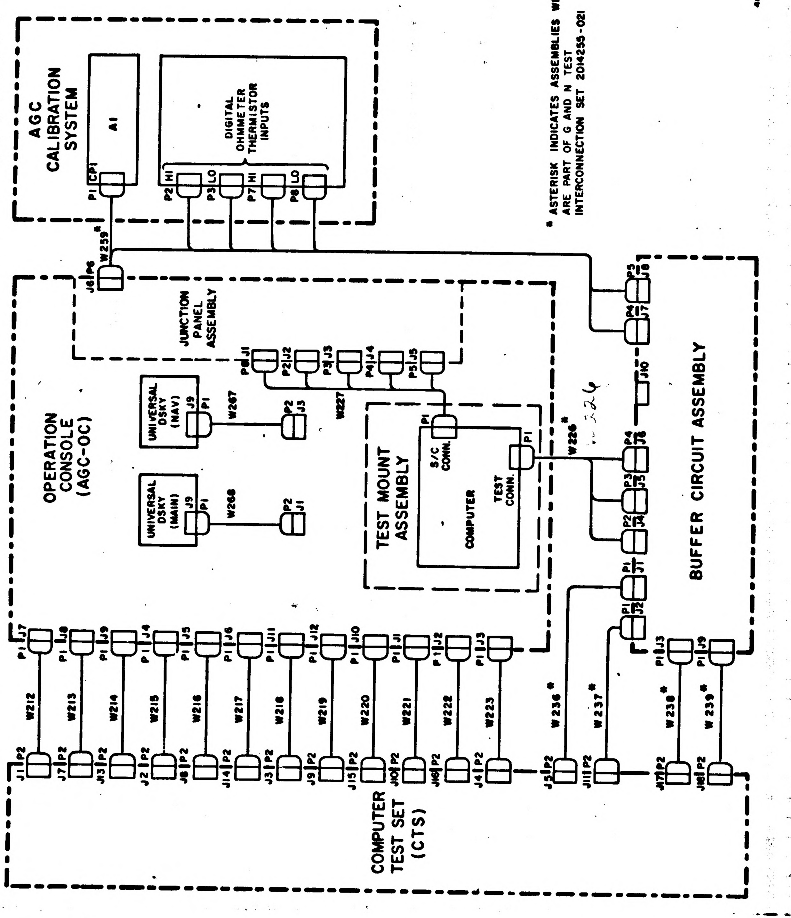

AGC CALIBRATION SYSTEM
A1
P1 CP1
DIGITAL OHMMETER THERMISTOR INPUTS
P2 HI
P3 LO
P7 HI
P8 LO
W259*
J6 P6
* ASTERISK INDICATES ASSEMBLIES WHICH ARE PART OF G AND N TEST INTERCONNECTION SET 2014255-021
40969A
OPERATION CONSOLE (AGC-OC)
JUNCTION PANEL ASSEMBLY
P6 J1
P2 J2
P3 J3
P4 J4
P5 J5
UNIVERSAL DSKY (NAV)
J9 P1
W267
P2 J3
UNIVERSAL DSKY (MAIN)
J9 P1
W268
P2 J1
W227
TEST MOUNT ASSEMBLY
P1
S/C CONN.
COMPUTER
TEST CONN.
P1
W226*
326
BUFFER CIRCUIT ASSEMBLY
P5 J8
P4 J7
J10
P4 J6
P3 J5
P2 J4
P1 J1
P1 J2
P1 J3
P1 J9
P1 J7
P1 J8
P1 J9
P1 J4
P1 J5
P1 J6
P1 J11
P1 J12
P1 J10
P1 J1
P1 J2
P1 J3
W212
W213
W214
W215
W216
W217
W218
W219
W220
W221
W222
W223
W236*
W237*
W238*
W239*
J1 P2
J7 P2
J13 P2
J2 P2
J8 P2
J14 P2
J3 P2
J9 P2
J15 P2
J10 P2
J16 P2
J4 P2
J5 P2
J11 P2
J17 P2
J18 P2
COMPUTER TEST SET (CTS)

Figure 1. Subsystem Test Interconnections

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 **REV.** B **PAGE** 1 **OF** 3
INITIAL TDRR 27956 **D.S. PGS** 0

SUBSYSTEM Computer
ASSY.

DESCRIPTION

Cable connections for GSE used during CSS test

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
Ⓜ A	10-13-66	31502	1,3	-	EA	-
B	1-12-67	32648	1	-	EA	-

REFERENCES

IMPORTANT

INTERVAL

TOOLS AND MATERIAL

1. Connect the Subsystem Test Interconnection Set (Drawing No. 2014268) as shown on figure 1.

2. Connect cable W259 to the AGC Calibration System as follows:

   a. Connect plug P1 to the COMPUTER SIGNAL jack on the Control and Interface Panel of the AGC Calibration System.

   b. Connect plug P2 to the "+" jack on the Digital Ohmmeter.

   c. Connect plug P3 to the "-" jack on the Digital Ohmmeter.

3. Connect the antenna cable to the jack located on top of the AGC Calibration System.

4. On the Connector Plate Assembly (A20) of the Computer Test Set make the following cable connections starting with the top jack:

   a. Connect cable W244 from the CNTR A jack to the FREQ A DC jack on the frequency counter.

   b. Connect cable W243 from the CNTR B jack to the STOP B jack on the Frequency Counter.

   c. Connect cable W245 from the SCOPE A jack to the channel A 1 MEG jack on the Oscilloscope.

   d. Connect cable W246 from the SCOPE B jack to the channel B 1 MEG jack on the Oscilloscope.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 **REV** B **PAGE** 2 **OF** 3

SUBSYSTEM Computer
ASSY

e. Connect cable W247 from the EXT SYNC jack to the EXT TRIG jack on the Normal and Delaying Triggering section of the Oscilloscope.

f. Connect cable W240 from the SCOPE A jack to the SCOPE A jack on the XY Interface panel.

g. Connect cable W248 from the SCOPE B jack to the SCOPE B jack on the XY Interface panel.

h. Connect cable W249 from the CNTR A jack to the CNTR-A jack on the XY Interface panel.

i. Connect cable W250 from the CNTR B jack to the CNTR-B jack on the XY Interface panel.

j. Connect cable W251 from the EXT SYNC jack to the EXT SY-1 jack on the XY Interface panel.

k. Connect cable W252 from the A jack to the SIGNAL SELECT A jack on the Self Test panel.

l. Connect cable W253 from the B jack to the DAB jack on the Self Test panel.

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 **REV** B **PAGE** 3 **OF** 3

SUBSYSTEM Computer
ASSY

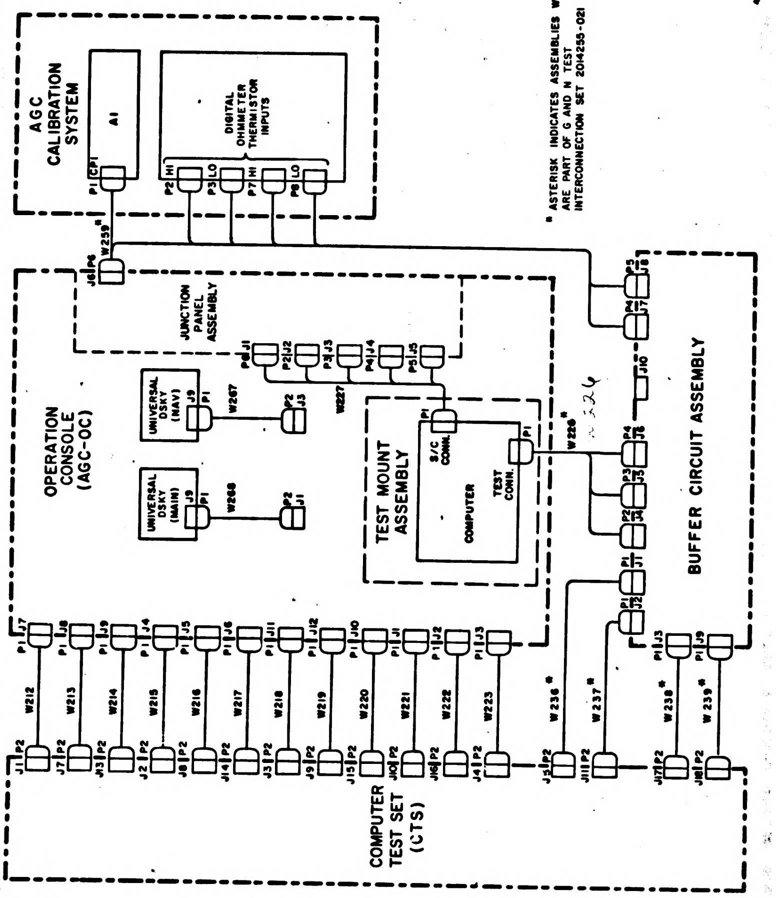

AGC CALIBRATION SYSTEM
A1
DIGITAL OHMMETER THERMISTOR INPUTS
P1 CP1
P2 HI
P3 LO
P7 HI
P8 LO
W259*
J6 P6
OPERATION CONSOLE (AGC-OC)
JUNCTION PANEL ASSEMBLY
P6 J1
P2 J2
P3 J3
P4 J4
P5 J5
UNIVERSAL DSKY (NAV)
J9 P1
W267
P2 J3
UNIVERSAL DSKY (MAIN)
J9 P1
W268
P2 J1
W227
TEST MOUNT ASSEMBLY
S/C CONN.
COMPUTER
TEST CONN.
P1
W226*
BUFFER CIRCUIT ASSEMBLY
P5 J8
P4 J7
J10
P4 J6
P3 J5
P2 J4
P1 J1
P1 J2
P1 J3
P1 J9
P1 J7
P1 J8
P1 J9
P1 J4
P1 J5
P1 J6
P1 J11
P1 J12
P1 J10
P1 J1
P1 J2
P1 J3
W212
W213
W214
W215
W216
W217
W218
W219
W220
W221
W222
W223
W236*
W237*
W238*
W239*
J1 P2
J7 P2
J3 P2
J2 P2
J8 P2
J14 P2
J3 P2
J9 P2
J15 P2
J10 P2
J16 P2
J4 P2
J5 P2
J11 P2
J17 P2
J18 P2
COMPUTER TEST SET (CTS)
* ASTERISK INDICATES ASSEMBLIES WHICH ARE PART OF G AND N TEST INTERCONNECTION SET 2014255-021
4096A

Figure 1. Subsystem Test Interconnections

DATE 12 APR 66

JOB GSE CABLING INSTRUCTIONS - BLOCK II AND LEM

JDC 05415 **REV.** C **PAGE** 1 **OF** 3

INITIAL TDRR 27956 **D.S. I'SS** 0

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Cable connections for GSE used during CSS test

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL		REFERENCES
			JDC	D.S.	MIT	NASA	
A	10-13-66	31502	1,3	-	EA	-	
B	1-12-67	32648	1	-	EA	-	
C	9-7-67	34514	1	-	EA	-	IMPORTANT
							INTERVAL
							TOOLS AND MATERIAL

1. Connect the Subsystem Test Interconnection Set (Drawing No. 2014268) as shown on figure 1.

NOTE: Omit steps 2 and 3 if an Auxiliary Calibration Console (2014059) is being used and connect cable W259 to Auxiliary Calibration System as follows:

a. Connect plug P1 to J2 (UUT) on Signal Interface Panel.

b. Connect plug P2 to SIGNAL HI jack on Digital Ohmmeter.

c. Connect plug P3 to SIGNAL LO jack on Digital Ohmmeter.

d. Plugs P7 and P8 are not connected at this time.

2. Connect cable W259 to the AGC Calibration System as follows:

a. Connect plug P1 to the COMPUTER SIGNAL jack on the Control and Interface Panel of the AGC Calibration System.

b. Connect plug P2 to the "+" jack on the Digital Ohmmeter.

c. Connect plug P3 to the "-" jack on the Digital Ohmmeter.

3. Connect the antenna cable to the jack located on top of the AGC Calibration System.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 APR 66

JOB GSE CABLING INSTRUCTIONS - BLOCK II AND LEM

JDC 05415 **REV** C **PAGE** 2 **OF** 3

SUBSYSTEM Computer

ASSY

4. On the Connector Plate Assembly (A20) of the Computer Test Set make the following cable connections starting with the top jack:

a. Connect cable W244 from the CNTR A jack to the FREQ A DC jack on the frequency counter.

b. Connect cable W243 from the CNTR B jack to the STOP B jack on the Frequency Counter.

c. Connect cable W245 from the SCOPE A jack to the channel A 1 MEG jack on the Oscilloscope.

d. Connect cable W246 from the SCOPE B jack to the channel B 1 MEG jack on the Oscilloscope.

e. Connect cable W247 from the EXT SYNC jack to the EXT TRIG jack on the Normal and Delaying Triggering section of the Oscilloscope.

f. Connect cable W240 from the SCOPE A jack to the SCOPE A jack on the XY Interface panel.

g. Connect cable W248 from the SCOPE B jack to the SCOPE B jack on the XY Interface panel.

h. Connect cable W249 from the CNTR A jack to the CNTR-A jack on the XY Interface panel.

i. Connect cable W250 from the CNTR B jack to the CNTR-B jack on the XY Interface panel.

j. Connect cable W251 from the EXT SYNC jack to the EXT SY-1 jack on the XY Interface panel.

k. Connect cable W252 from the A jack to the SIGNAL SELECT A jack on the Self Test panel.

l. Connect cable W253 from the B jack to the DAB jack on the Self Test panel.

DATE 12 APR 66

JOB GSE CABLING INSTRUCTIONS - BLOCK II AND LEM

JDC 05415 **REV** C **PAGE** 3 **OF** 3

SUBSYSTEM Computer

ASSY

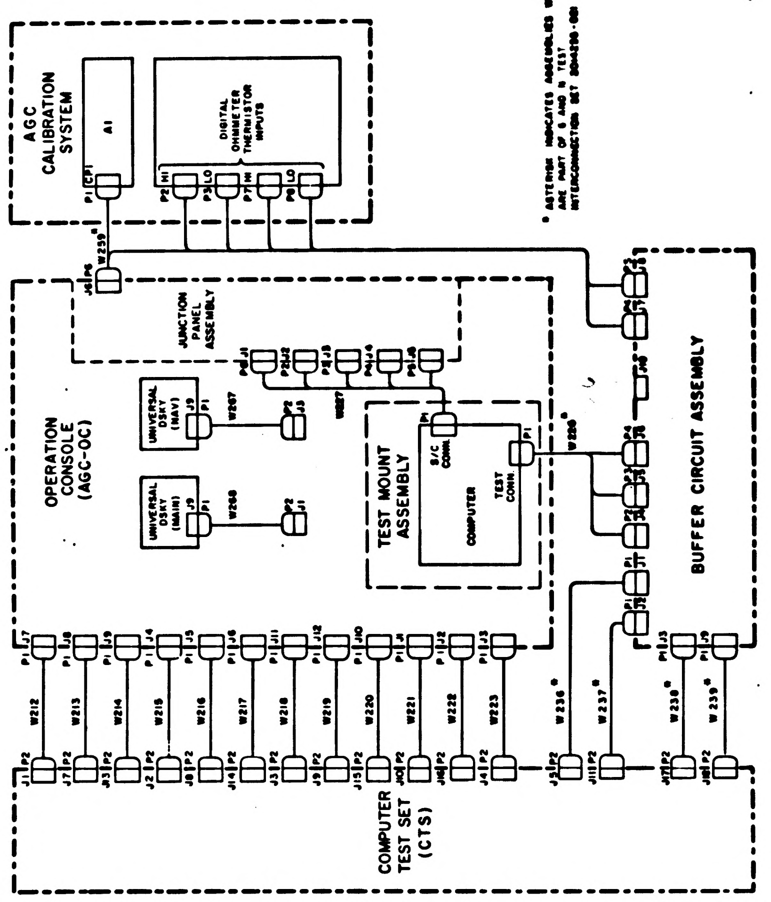

AGC CALIBRATION SYSTEM
A1
DIGITAL OHMMETER THERMISTOR INPUTS
P1 CP1
P2 HI
P3 LO
P7 HI
P8 LO
W259*
J6 P6
JUNCTION PANEL ASSEMBLY
P6 J1
P2 J2
P5 J3
P4 J4
P5 J5
W267
OPERATION CONSOLE (AGC-OC)
UNIVERSAL DSKY (NAV)
UNIVERSAL DSKY (MAIN)
J9
P1
W207
W208
P2
J3
J1
TEST MOUNT ASSEMBLY
S/C CONN.
COMPUTER
TEST CONN.
W236*
BUFFER CIRCUIT ASSEMBLY
W212
W213
W214
W215
W216
W217
W218
W219
W220
W221
W222
W223
W236*
W237*
W238*
W239*
COMPUTER TEST SET (CTS)
* ASTERISK INDICATES ASSEMBLIES WHICH ARE PART OF 6 AND N TEST INTERCONNECTION SET 2014268-001

Figure 1. Subsystem Test Interconnections

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 REV. D PAGE 1 OF 3
INITIAL TDRR 27956 D.S. PG:3 0

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Cable connections for GSE used during CSS test

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	10-13-66	31502	1, 3	-	EA	-
B	1-12-67	32648	1	-	EA	-
C	9-7-67	34514	1	-	EA	-
D	3-29-68	35991	1, 3	-	EA	-

REFERENCES

IMPORTANT

INTERVAL

TOOLS AND MATERIAL

1. Connect the Subsystem Test Interconnection Set (Drawing No. 2014268) as shown on figure 1.

NOTE: Omit steps 2 and 3 if an Auxiliary Calibration Console (2014059) is being used and connect cable W259 to Auxiliary Calibration System as follows:

a. Connect plug P1 to J2 (UUT) on Signal Interface Panel.

b. Connect plug P2 to SIGNAL HI jack on Digital Ohmmeter.

c. Connect plug P3 to SIGNAL LO jack on Digital Ohmmeter.

d. Plugs P7 and P8 are not connected at this time.

2. Connect cable W259 to the AGC Calibration System as follows:

a. Connect plug P1 to the COMPUTER SIGNAL jack on the Control and Interface Panel of the AGC Calibration System.

b. Connect plug P2 to the SIGNAL HI jack on the Digital Ohmmeter.

c. Connect plug P3 to the SIGNAL LO jack on the Digital Ohmmeter.

3. Connect the antenna cable to the jack located on top of the AGC Calibration System.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 REV D PAGE 2 OF 3

SUBSYSTEM Computer

ASSY

4. On the Connector Plate Assembly (A20) of the Computer Test Set make the following cable connections starting with the top jack:

a. Connect cable W244 from the CNTR A jack to the FREQ A DC jack on the frequency counter.

b. Connect cable W243 from the CNTR B jack to the STOP B jack on the Frequency Counter.

c. Connect cable W245 from the SCOPE A jack to the channel A 1 MEG jack on the Oscilloscope.

d. Connect cable W246 from the SCOPE B jack to the channel B 1 MEG jack on the Oscilloscope.

e. Connect cable W247 from the EXT SYNC jack to the EXT TRIG jack on the Normal and Delaying Triggering section of the Oscilloscope.

f. Connect cable W240 from the SCOPE A jack to the SCOPE A jack on the XY Interface panel.

g. Connect cable W248 from the SCOPE B jack to the SCOPE B jack on the XY Interface panel.

h. Connect cable W249 from the CNTR A jack to the CNTR-A jack on the XY Interface panel.

i. Connect cable W250 from the CNTR B jack to the CNTR-B jack on the XY Interface panel.

j. Connect cable W251 from the EXT SYNC jack to the EXT SY-1 jack on the XY Interface panel.

k. Connect cable W252 from the A jack to the SIGNAL SELECT A jack on the Self Test panel.

l. Connect cable W253 from the B jack to the DAB jack on the Self Test panel.

DATE 12 APR 66

GSE CABLING INSTRUCTIONS-
JOB BLOCK II AND LEM

JDC 05415 REV D PAGE 3 OF 3

SUBSYSTEM Computer

ASSY

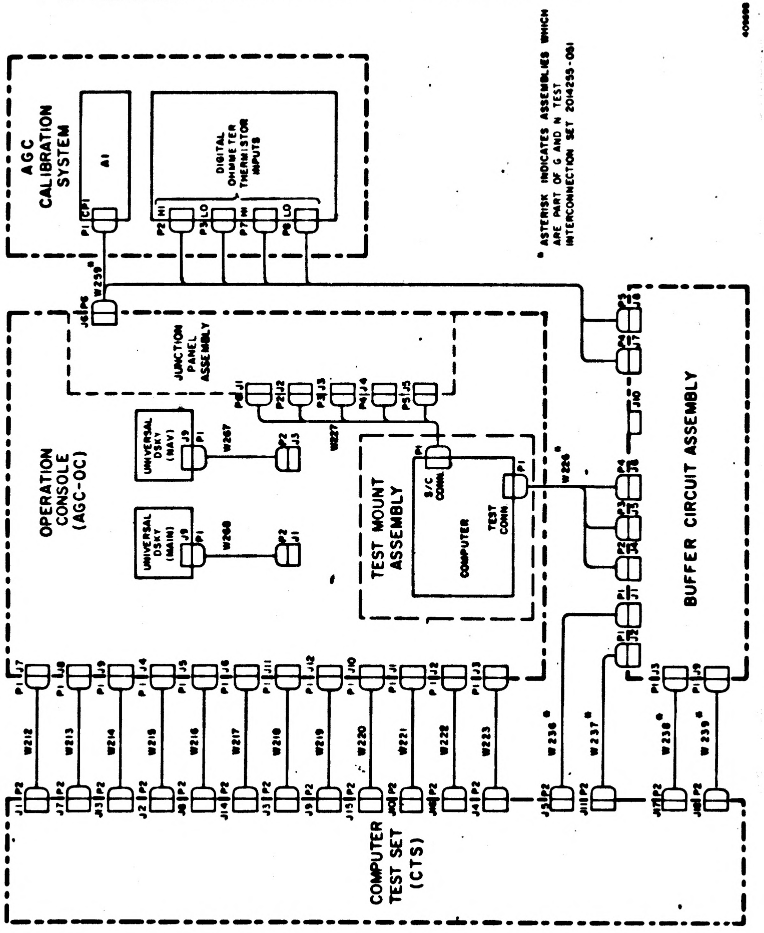

AGC CALIBRATION SYSTEM
A1
DIGITAL OHMMETER THERMISTOR INPUTS
P1 CP1
P2 HI
P3 LO
P7 HI
P8 LO
W259*
J6 P6
JUNCTION PANEL ASSEMBLY
P1 J1
P2 J2
P3 J3
P4 J4
P5 J5
W227
OPERATION CONSOLE (AGC-OC)
UNIVERSAL DSKY (NAV)
UNIVERSAL DSKY (MAIN)
J9 P1
W267
W268
P2 J3
P2 J1
TEST MOUNT ASSEMBLY
COMPUTER
S/C CONN
TEST CONN
W226*
BUFFER CIRCUIT ASSEMBLY
J10
W212
W213
W214
W215
W216
W217
W218
W219
W220
W221
W222
W223
W236*
W237*
W238*
W239*
COMPUTER TEST SET (CTS)
* ASTERISK INDICATES ASSEMBLIES WHICH ARE PART OF G AND N TEST INTERCONNECTION SET 2014255-061

Figure 1. Subsystem Test Interconnections

DATE 12 APR 66

FORM 00145
Chg. 7-23-65

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 REV. E PAGE 1 OF 3
INITIAL TDRR 27956 D.S. PGS 0

SUBSYSTEM Computer
DESCRIPTION

ASSY.

Cable connections for GSE used during CSS test

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	10-13-66	31502	1,3	-	EA	-
B	1-12-67	32648	1	-	EA	-
C	9-7-67	34514	1	-	EA	-
D	3-29-68	35991	1,3	-	EA	-
E	9-26-68	36862	1	-	EA	-

REFERENCES

IMPORTANT
See below.

INTERVAL

TOOLS AND MATERIAL

IMPORTANT
Refer to JDC 18100 for lubrication instructions prior to engaging any screw or bolt into header helicoil inserts, and for helicoil insert cleaning instructions after all testing has been completed or prior to spacecraft installation.

1. Connect the Subsystem Test Interconnection Set (Drawing No. 2014268) as shown on figure 1.

NOTE: Omit steps 2 and 3 if an Auxiliary Calibration Console (2014059) is being used and connect cable W259 to Auxiliary Calibration System as follows:

a. Connect plug P1 to J2 (UUT) on Signal Interface Panel.

b. Connect plug P2 to SIGNAL HI jack on Digital Ohmmeter.

c. Connect plug P3 to SIGNAL LO jack on Digital Ohmmeter.

d. Plugs P7 and P8 are not connected at this time.

2. Connect cable W259 to the AGC Calibration System as follows:

a. Connect plug P1 to the COMPUTER SIGNAL jack on the Control and Interface Panel of the AGC Calibration System.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 REV E PAGE 2 OF 3

SUBSYSTEM Computer

ASSY

b. Connect plug P2 to the SIGNAL HI jack on the Digital Ohmmeter.

c. Connect plug P3 to the SIGNAL LO jack on the Digital Ohmmeter.

3. Connect the antenna cable to the jack located on top of the AGC Calibration System.

4. On the Connector Plate Assembly (A20) of the Computer Test Set make the following cable connections starting with the top jack:

a. Connect cable W244 from the CNTR A jack to the FREQ A DC jack on the frequency counter.

b. Connect cable W243 from the CNTR B jack to the STOP B jack on the Frequency Counter.

c. Connect cable W245 from the SCOPE A jack to the channel A 1 MEG jack on the Oscilloscope.

d. Connect cable W246 from the SCOPE B jack to the channel B 1 MEG jack on the Oscilloscope.

e. Connect cable W247 from the EXT SYNC jack to the EXT TRIG jack on the Normal and Delaying Triggering section of the Oscilloscope.

f. Connect cable W240 from the SCOPE A jack to the SCOPE A jack on the XY Interface panel.

g. Connect cable W248 from the SCOPE B jack to the SCOPE B jack on the XY Interface panel.

h. Connect cable W249 from the CNTR A jack to the CNTR-A jack on the XY Interface panel.

i. Connect cable W250 from the CNTR B jack to the CNTR-B jack on the XY Interface panel.

j. Connect cable W251 from the EXT SYNC jack to the EXT SY-1 jack on the XY Interface panel.

k. Connect cable W252 from the A jack to the SIGNAL SELECT A jack on the Self Test panel.

l. Connect cable W253 from the B jack to the DAB jack on the Self Test panel.

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 REV E PAGE 3 OF 3

SUBSYSTEM Computer

ASSY

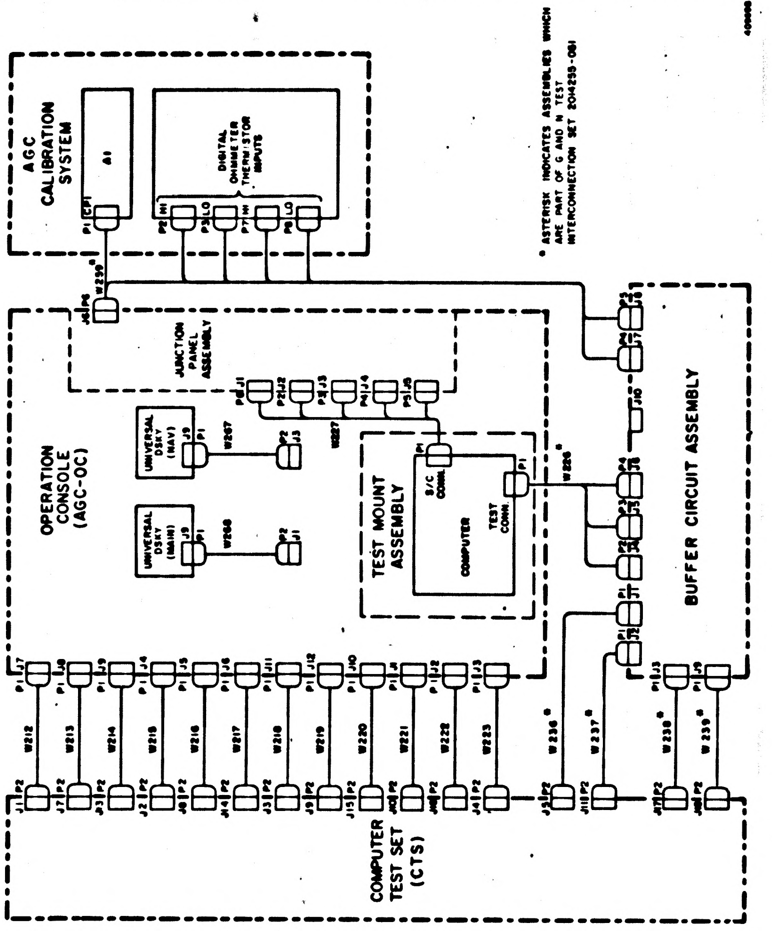

AGC CALIBRATION SYSTEM
A1
DIGITAL OHMMETER THERMISTOR INPUTS
P1 CP1
P2 HI
P3 LO
P7 HI
P8 LO
W259*
J51 P4
OPERATION CONSOLE (AGC-OC)
JUNCTION PANEL ASSEMBLY
P6 J1
P2 J2
P3 J3
P4 J4
P5 J5
UNIVERSAL DSKY (NAV)
UNIVERSAL DSKY (MAIN)
J9
P1
P2
J3
J1
W267
W268
W227
TEST MOUNT ASSEMBLY
S/C CONN
TEST CONN
COMPUTER
W226*
BUFFER CIRCUIT ASSEMBLY
P3 J8
P6 J7
J10
P4 J6
P3 J5
P2 J4
P1 J7
P1 J2
P1 J3
P1 J9
W212
W213
W214
W215
W216
W217
W218
W219
W220
W221
W222
W223
W236*
W237*
W238*
W239*
COMPUTER TEST SET (CTS)
* ASTERISK INDICATES ASSEMBLIES WHICH ARE PART OF G AND N TEST INTERCONNECTION SET 2014255-081

Figure 1. Subsystem Test Interconnections

DATE 12 APR 66

FORM 00145
Chg. 7-23-6

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 REV. F PAGE 1 OF 3
INITIAL TDRR 27956 D.S. PGS 0

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Cable connections for GSE used during CSS test

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA
A	10-13-66	31502	1, 3	-	EA	-
B	1-12-67	32648	1	-	EA	-
C	9-7-67	34514	1	-	EA	-
D	3-29-68	35991	1, 3	-	EA	-
E	9-26-68	36862	1	-	EA	-
F	10-17-68	36905	2	-	EA	-

REFERENCES

IMPORTANT
See below.

INTERVAL

TOOLS AND MATERIAL

IMPORTANT
Refer to JDC 18100 for lubrication instructions prior to engaging any screw or bolt into header helicoil inserts, and for helicoil insert cleaning instructions after all testing has been completed or prior to spacecraft installation.

1. Connect the Subsystem Test Interconnection Set (Drawing No. 2014268) as shown on figure 1.

NOTE: Omit steps 2 and 3 if an Auxiliary Calibration Console (2014059) is being used and connect cable W259 to Auxiliary Calibration System as follows:

a. Connect plug P1 to J2 (UUT) on Signal Interface Panel.

b. Connect plug P2 to SIGNAL HI jack on Digital Ohmmeter.

c. Connect plug P3 to SIGNAL LO jack on Digital Ohmmeter.

d. Plugs P7 and P8 are not connected at this time.

2. Connect cable W259 to the AGC Calibration System as follows:

a. Connect plug P1 to the COMPUTER SIGNAL jack on the Control and Interface Panel of the AGC Calibration System.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 REV F PAGE 2 OF 3

SUBSYSTEM Computer

ASSY

b. Connect plug P2 to the SIGNAL HI jack on the Digital Ohmmeter.

c. Connect plug P3 to the SIGNAL LO jack on the Digital Ohmmeter.

3. Connect the antenna cable to the jack located on top of the AGC Calibration System.

4. On the Connector Plate Assembly (A20) of the Computer Test Set make the following cable connections starting with the top jack:

a. Connect cable W244 from the CNTR A jack to the FREQ A DC jack on the frequency counter.

b. Connect cable W243 from the CNTR B jack to the STOP B jack on the Frequency Counter.

c. Connect cable W245 from the SCOPE A jack to the channel A 1 MEG jack on the Oscilloscope.

d. Connect cable W246 from the SCOPE B jack to the channel B 1 MEG jack on the Oscilloscope.

e. Connect cable W247 from the EXT SYNC jack to the EXT TRIG jack on the Normal and Delaying Triggering section of the Oscilloscope.

f. Connect cable W240 from the SCOPE A jack to the SCOPE A jack on the XY Interface panel.

g. Connect cable W248 from the SCOPE B jack to the SCOPE B jack on the XY Interface panel.

h. Connect cable W249 from the CNTR A jack to the CNTR-A jack on the XY Interface panel.

i. Connect cable W250 from the CNTR B jack to the CNTR-B jack on the XY Interface panel.

j. Connect cable W251 from the EXT SYNC jack to the EXT SY-1 jack on the XY Interface panel.

k. Connect cable W252 from the A jack to the SIGNAL SELECT A jack on the Self Test panel.

l. Connect cable W253 from the B jack to the DAB jack on the Self Test panel.

NOTE: Perform step 5 only if an auxiliary calibration console (2014059) is being used.

5. Connect cable W241 (P/N 2014080-171) between J1 (time base) of auxiliary calibration console and the 1 mc standard signal outlet.

DATE 12 APR 66

GSE CABLING INSTRUCTIONS-
JOB BLOCK II AND LEM

JDC 05415 REV F PAGE 3 OF 3

SUBSYSTEM Computer

ASSY

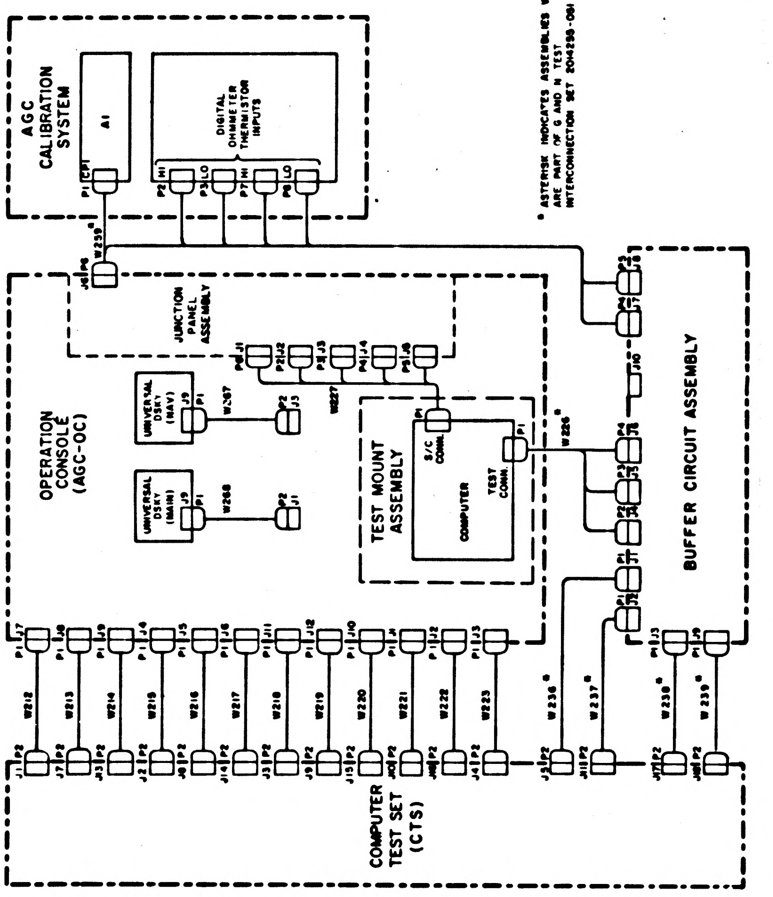

AGC CALIBRATION SYSTEM
A1
DIGITAL OHMMETER THERMISTOR INPUTS
P1 CP1
P2 HI
P3 LO
P7 HI
P8 LO
W259*
J6 P6
JUNCTION PANEL ASSEMBLY
P6 J1
P2 J2
P3 J3
P4 J4
P5 J5
W227
UNIVERSAL DSKY (NAV)
J9 P1
W267
P2 J3
UNIVERSAL DSKY (MAIN)
J9 P1
W268
P2 J1
OPERATION CONSOLE (AGC-OC)
TEST MOUNT ASSEMBLY
P1
S/C COMM.
COMPUTER
TEST COMM.
P1
W226*
BUFFER CIRCUIT ASSEMBLY
P3 J8
P4 J7
J10
P4 J6
P3 J5
P2 J4
P1 J1
P1 J2
P1 J3
P1 J9
P1 J7
P1 J8
P1 J9
P1 J4
P1 J5
P1 J6
P1 J11
P1 J12
P1 J10
P1 J4
P1 J2
P1 J3
W212
W213
W214
W215
W216
W217
W218
W219
W220
W221
W222
W223
W236*
W237*
W238*
W239*
J1 P2
J7 P2
J3 P2
J2 P2
J6 P2
J14 P2
J3 P2
J9 P2
J15 P2
J10 P2
J16 P2
J4 P2
J5 P2
J11 P2
J17 P2
J18 P2
COMPUTER TEST SET (CTS)
* ASTERISK INDICATES ASSEMBLIES WHICH ARE PART OF G AND N TEST INTERCONNECTION SET 2014256-081

Figure 1. Subsystem Test Interconnections

DATE 12 APR 66

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 **REV.** - **PAGE** 1 **OF** 3
INITIAL TDRR 27956 **D.S. PGS** 0

SUBSYSTEM Computer
ASSY.

DESCRIPTION

Cable connections for GSE used during CSS test

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA

REFERENCES

IMPORTANT

INTERVAL

TOOLS AND MATERIAL

1. Connect the Subsystem Test Interconnection Set (P/N 2014268-011) as shown on figure 1.

2. Connect cable W259 to the AGC Calibration System as follows:

   a. Connect plug P1 to the COMPUTER SIGNAL jack on the Control and Interface Panel of the AGC Calibration System.

   b. Connect plug P2 to the "+" jack on the Digital Ohmmeter.

   c. Connect plug P3 to the "-" jack on the Digital Ohmmeter.

3. Connect the antenna cable to the jack located on top of the AGC Calibration System.

4. On the Connector Plate Assembly (A20) of the Computer Test Set make the following cable connections starting with the top jack:

   a. Connect cable W244 from the CNTR A jack to the FREQ A DC jack on the frequency counter.

   b. Connect cable W2 [illegible] from the CNTR B jack to the STOP [illegible] jack on the Frequency Counter.

   c. Connect cable W245 from the SCOPE A jack to the channel A 1 MEG jack on the Oscilloscope.

   d. Connect cable W246 from the SCOPE B jack to the channel B 1 MEG jack on the Oscilloscope.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ________

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 **REV** - **PAGE** 2 **OF** 3

SUBSYSTEM Computer
ASSY

e. Connect cable W247 from the EXT SYNC jack to the EXT TRIG jack on the Normal and Delaying Triggering section of the Oscilloscope.

f. Connect cable W240 from the SCOPE A jack to the SCOPE A jack on the XY Interface panel.

g. Connect cable W248 from the SCOPE B jack to the SCOPE B jack on the XY Interface panel.

h. Connect cable W249 from the CNTR A jack to the CNTR-A jack on the XY Interface panel.

i. Connect cable W250 from the CNTR B jack to the CNTR-B jack on the XY Interface panel.

j. Connect cable W251 from the EXT SYNC jack to the EXT SY-1 jack on the XY Interface panel.

k. Connect cable W252 from the A jack to the SIGNAL SELECT A jack on the Self Test panel.

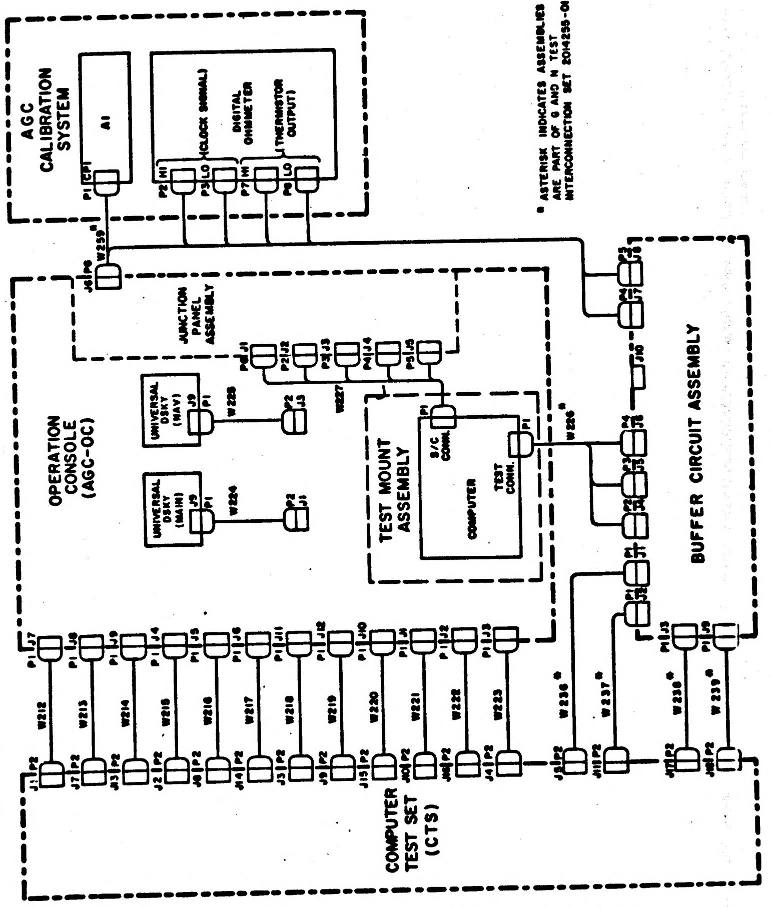
l. Connect cable W253 from the B jack to the DAB jack on the Self Test panel.

DATE ________

GSE CABLING INSTRUCTIONS -
JOB BLOCK II AND LEM

JDC 05415 **REV** - **PAGE** 3 **OF** 3

SUBSYSTEM Computer
ASSY


AGC CALIBRATION SYSTEM
A1
P1 CP1
P2 HI
P3 LO
P7 HI
P8 LO
(CLOCK SIGNAL)
DIGITAL OHMMETER
(THERMISTOR OUTPUT)
W259*
J6 P6
JUNCTION PANEL ASSEMBLY
P6 J1
P2 J2
P3 J3
P4 J4
P5 J5
OPERATION CONSOLE (AGC-OC)
UNIVERSAL DSKY (NAV)
UNIVERSAL DSKY (MAIN)
J9 P1
W225
W224
P2 J3
P2 J1
W227
TEST MOUNT ASSEMBLY
P1
S/C CONN.
COMPUTER
TEST CONN.
W226*
BUFFER CIRCUIT ASSEMBLY
P3 J8
P4 J7
J10
P4 J6
P3 J5
P2 J4
P1 J7
P1 J2
P1 J13
P1 J9
P1 J7
P1 J8
P1 J9
P1 J4
P1 J5
P1 J6
P1 J11
P1 J12
P1 J10
P1 J1
P1 J2
P1 J3
W212
W213
W214
W215
W216
W217
W218
W219
W220
W221
W222
W223
W236*
W237*
W238*
W239*
J1 P2
J7 P2
J13 P2
J2 P2
J6 P2
J14 P2
J3 P2
J9 P2
J15 P2
J10 P2
J16 P2
J4 P2
J5 P2
J11 P2
J17 P2
J18 P2
COMPUTER TEST SET (CTS)

* ASTERISK INDICATES ASSEMBLIES WHICH ARE PART OF G AND N TEST INTERCONNECTION SET 2014255-011

Figure 1. Subsystem Test Interconnections

DATE ________

JOB INSTALLATION AND REMOVAL OF FIXED MEMORY MODULES AND FIXED MEMORY JUMPER MODULES - BLOCK II AND LEM

JDC 05416 **REV.** A **PAGE** 1 **OF** 2
INITIAL TDRR 27956 **D.S. PGS** 0

SUBSYSTEM Computer
ASSY.

DESCRIPTION

Installation and removal of fixed memory rope and jumper modules in the computer

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-26-68	36862	1	-	EA	-

REFERENCES

IMPORTANT See below.

INTERVAL As required

TOOLS AND MATERIAL 0-25 inch pound torque wrench. 5/32 Allen adapter.

IMPORTANT

Refer to JDC 18100 for lubrication instructions prior to engaging any screw or bolt into header helicoil inserts, and for helicoil insert cleaning instructions after all testing has been completed or prior to spacecraft installation.

INSTALLATION

> NOTE: Fixed memory module to be operative must be installed in pairs or ropes. If one module is to be used then a jumper module must be used. Refer to table page 2.

1. Inspect the connector of the module for bent or broken pins.

2. Refer to the diagram on the second page of this JDC. Insert the module in the computer.

3. Alternating on the jacking screws tighten them with a torque wrench one turn each until they are 15 to 19 inch-pounds.

REMOVAL

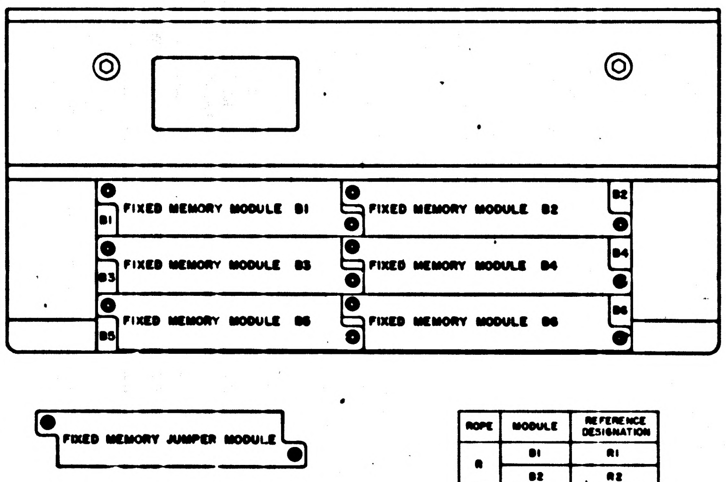
4. Remove modules using the torque wrench fitted with a 5/32" Allen adapter. Alternate each module jacking screw so that module is withdrawn straight from computer.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 12 APR 66

JOB INSTALLATION AND REMOVAL OF FIXED MEMORY MODULES AND FIXED MEMORY JUMPER MODULES - BLOCK II AND LEM

JDC 05416 **REV** A **PAGE** 2 **OF** 2

SUBSYSTEM Computer
ASSY


FIXED MEMORY MODULE B1
FIXED MEMORY MODULE B2
FIXED MEMORY MODULE B3
FIXED MEMORY MODULE B4
FIXED MEMORY MODULE B5
FIXED MEMORY MODULE B6
B1
B2
B3
B4
B5
B6
FIXED MEMORY JUMPER MODULE

ROPE	MODULE	REFERENCE DESIGNATION
R	B1	R1
	B2	R2
S	B3	S1
	B4	S2
T	B5	T1
	B6	T2

DATE 12 APR 66

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM	**JDC** 05417 **REV.** A **PAGE** 1 **OF** 2 **INITIAL TDRR** 27956 **D.S. PGS** 1
SUBSYSTEM Computer	**ASSY.**

DESCRIPTION

Procedure for installing and removing the computer (with handling fixture) in the Operation Console

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	10-13-66	31503	All	-	EA	-

REFERENCES
GSE Cabling Instructions, JDC 05415
NASA Drawing No. 2016402

IMPORTANT
See note preceeding instructions

INTERVAL

TOOLS AND MATERIAL

NOTE: Installation and removal of the computer in the Operation Console requires two men.

INSTALLATION

1. On the Operation Console (AC Input panel) set the STA POWER circuit breaker to the OFF position.

2. On the Computer Test Set (AC Input panel) set the STA POWER circuit breaker to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

3. Disconnect and remove cables W226 and W227 from the Operation Console. (Refer to GSE Cabling Instructions JDC 05415.)

4. Unlock and slide the Test Mount Drawer Assembly all the way out.

5. With one man at each handle, lift the computer and remove the protective cover from the bottom by unsnapping it.

6. Place the computer on the Test Mount Drawer Assembly.

7. Remove the handling fixture from the front of the computer. This is the end without the connectors on it.

8. Center the computer on the drawer assembly with the rear of the computer to the front of the assembly.

9. Remove the protective covers from the computer connectors.

10. Refer to GSE Cabling Instructions JDC 05415. Connect W226 and W227 to the computer and the console.

11. Release the slide lock devices and slide the test mount drawer in as far as it will go. Lock the drawer in.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 12 APR 66

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM	**JDC** 05417 **REV** A **PAGE** 2 **OF** 2
SUBSYSTEM Computer	**ASSY**

12. Using a multimeter, measure the resistance between the computer case and the 0 vdc return line terminal E1 on the 28 vdc power supply of the Operation Console. Record on data sheet.

13. Refer to Drawing No. 2016402. Attach ground strap Part No. 2014457-041 to the computer.

REMOVAL

14. On the Operation Console (AC Input panel) set the STA POWER circuit breaker to the OFF position.

15. On the Computer Test Set (AC Input panel) set the STA POWER circuit breaker to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

16. Refer to NASA Drawing No. 2016402. Remove ground strap Part No. 2014457-041.

17. Unlock and slide Test Mount Drawer Assembly part way out.

18. Disconnect and remove W226 and W227.

19. Slide drawer all the way out. Assemble the front AGC Handling Assembly to the computer.

20. Place the protective covers on the computer connectors.

21. Lift the computer off the Test Mount Drawer Assembly and place protective cover on the bottom of the computer snapping it in place on the AGC Handling Assembly.

22. Place the computer on the computer shelf of the G&N transportation cart.

23. Release the slide lock on the Test Mount Drawer and slide drawer in as far as it will go. Lock the drawer in.

DATE 12 APR 66

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

NO. 05417 JDC
REV. A
INITIAL TDRR 27956

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ **DWG** ______ **REV.** ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ **SER. NO.** ______ CAL DATE

NAME ______ **SER. NO.** ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION **APPROVED BY** ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
12	Resistance	NMT 2 ohms	______

DATE 12 APR 66

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

JDC 05417 REV. B PAGE 1 OF 2
INITIAL TDRR 27956 D.S. PGS 1

SUBSYSTEM Computer
ASSY.

DESCRIPTION

Procedure for installing and removing the computer (with handling fixture) in the Operation Console

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	10-13-66	31503	All	-	EA	-
B	6-30-67	34036	All	-	EA	-

REFERENCES
GSE Cabling Instructions, JDC 05415
NASA Drawing No. 2016402

IMPORTANT
See note preceeding instructions

INTERVAL

TOOLS AND MATERIAL
Torque wrench, 0-25 inch-pounds

NOTE: Installation and removal of the computer in the Operation Console requires two men.

INSTALLATION

1. On the Operation Console (AC Input panel) set the STA POWER circuit breaker to the OFF position.

2. On the Computer Test Set (AC Input panel) set the STA POWER circuit breaker to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

3. Disconnect and remove cables W226 and W227 from the Operation Console. (Refer to GSE Cabling Instructions JDC 05415.)

4. Unlock and slide the Test Mount Drawer Assembly all the way out.

5. With one man at each handle, lift the computer and remove the protective cover from the bottom by unsnapping it.

6. Place the computer on the Test Mount Drawer Assembly.

7. Remove the handling fixture from the front of the computer. This is the end without the connectors on it.

8. Center the computer on the drawer assembly with the rear of the computer to the front of the assembly.

9. Remove the protective cover from the computer interface connector (A51). Carefully remove the protective cover assembly (2003099) from the test connector (A52). Turn each screw 1/2 turn at a time to insure even release of the connector cover and to avoid bending the Malco pins.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 12 APR 66

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

JDC 05417 REV B PAGE 2 OF 2

SUBSYSTEM Computer
ASSY

CAUTION: Store the test connector cover assembly safely so that the Malco pins will not be accidentally broken or bent.

10. Refer to GSE Cabling Instructions JDC 05415. Connect W226 and W227 to the computer and the console.

11. Release the slide lock devices and slide the test mount drawer in as far as it will go. Lock the drawer in.

12. Using a multimeter, measure the resistance between the computer case and the 0 vdc return line terminal E1 on the 28 vdc power supply of the Operation Console. Record on data sheet.

13. Refer to Drawing No. 2016402. Attach ground strap Part No. 2014457-041 to the computer.

REMOVAL

14. On the Operation Console (AC Input panel) set the STA POWER circuit breaker to the OFF position.

15. On the Computer Test Set (AC Input panel) set the STA POWER circuit breaker to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

16. Refer to NASA Drawing No. 2016402. Remove ground strap Part No. 2014457-041.

17. Unlock and slide Test Mount Drawer Assembly part way out.

18. Disconnect and remove W226 and W227.

19. Slide drawer all the way out. Assemble the front AGC Handling Assembly to the computer.

20. Replace the protective cover on the computer interface connector. Check the test connector cover assembly for bent pins prior to replacement. Replace the cover assembly on the test connector turning each captive screw 1/2 turn at a time. Torque all four screws to 18-22 inch-pounds.

21. Lift the computer off the Test Mount Drawer Assembly and place protective cover on the bottom of the computer snapping it in place on the AGC Handling Assembly.

22. Place the computer on the computer shelf of the G&N transportation cart.

23. Release the slide lock on the Test Mount Drawer and slide drawer in as far as it will go. Lock the drawer in.

DATE 12 APR 66

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC NO. 05417
REV. B
INITIAL TDRR 27956

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION ____
TIME ____ START ____ END ____ TOTAL ELAPSED ____

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE ____
NAME ____ SER. NO. ____ CAL DATE ____

CONDUCTED BY ____ NAME/AFFILIATION
APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
12	Resistance	NMT 2 ohms	

DATE 12 APR 66

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

JDC 05417 **REV.** C **PAGE** 1 **OF** 2
INITIAL TDRR 27956 **D.S. PGS** 1

SUBSYSTEM Computer
ASSY.

DESCRIPTION

Procedure for installing and removing the computer (with handling fixture) in the Operation Console

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
M A	10-13-66	31503	All	-	EA	-
(F) B	6-30-67	34036	All	-	EA	-
C	10-20-67	34889	All	-	EA	-

REFERENCES
GSE Cabling Instructions, JDC 05415
NASA Drawing No. 2016402

IMPORTANT
See note preceeding instructions

INTERVAL

TOOLS AND MATERIAL
Torque wrench, 0-25 inch-pounds

NOTE: Installation and removal of the computer in the Operation Console requires two men.

INSTALLATION

1. On the Operation Console (AC Input panel) set the STA POWER circuit breaker to the OFF position.

2. On the Computer Test Set (AC Input panel) set the STA POWER circuit breaker to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

3. Disconnect and remove cables W226 and W227 from the Operation Console. (Refer to GSE Cabling Instructions JDC 05415.)

4. Unlock and slide the Test Mount Drawer Assembly all the way out.

5. With one man at each handle, lift the computer and remove the protective cover from the bottom by unsnapping it.

6. Place the computer on the Test Mount Drawer Assembly.

7. Center the computer on the drawer assembly with the connector end of the computer to the front of the assembly.

8. Attach ground strap Part No. 2014457-051 between E6 of the Operation Console cold plate and a screw storage hole in the computer handling fixture. Insure that the screw does not bottom out against the computer.

9. Remove the protective cover from the computer interface connector J1 (A51). Remove and retain the six nylon screws from the threaded inserts surrounding the interface connector.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 APR 66

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

JDC 05417 **REV** C **PAGE** 2 **OF** 2

SUBSYSTEM Computer
ASSY

9A. Carefully remove the protective cover assembly (2003099) from the test connector (A52). Turn each screw 1/2 turn at a time to insure even release of the connector cover and to avoid bending the Malco pins.

CAUTION: Store the test connector cover assembly safely so that the Malco pins will not be accidentally broken or bent.

10. Refer to GSE Cabling Instructions JDC 05415. Connect W226 and W227 to the computer and the console.

11. Release the slide lock devices and slide the test mount drawer in as far as it will go. Lock the drawer in.

12. Using a multimeter, measure the resistance between the computer case and the 0 vdc return line terminal E1 on the 28 vdc power supply of the Operation Console. Record on data sheet.

13. Refer to Drawing No. 2016402. Attach ground strap Part No. 2014457-041 between E6 of the Operation Console cold plate and E1 of the buffer box.

REMOVAL

14. On the Operation Console (AC Input panel) set the STA POWER circuit breaker to the OFF position.

15. On the Computer Test Set (AC Input panel) set the STA POWER circuit breaker to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

16. Refer to NASA Drawing No. 2016402. Remove ground strap Part No. 2014457-041.

17. Unlock and slide Test Mount Drawer Assembly part way out.

18. Disconnect and remove W226 and W227.

19. Slide drawer all the way out.

19A. Remove ground strap Part No. 2014457-051 from the screw storage hole in the computer handling fixture.

20. Replace the six nylon screws which were removed in step 9, into the threaded inserts surrounding the interface connector. Replace the protective cover on the computer interface connector.

20A. Check the test connector cover assembly for bent pins prior to replacement. Replace the cover assembly on the test connector turning each captive screw 1/2 turn at a time. Torque all four screws to 18-22 inch-pounds.

21. Lift the computer off the Test Mount Drawer Assembly and place protective cover on the bottom of the computer snapping it in place on the AGC Handling Assembly.

22. Place the computer on the computer shelf of the G&N transportation cart.

23. Release the slide lock on the Test Mount Drawer and slide drawer in as far as it will go. Lock the drawer in.

DATE 12 APR 66

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

JDC NO. 05417
REV. C
INITIAL TDRR 27956

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

ASSEMBLY UNDER TEST

TITLE ____________
SER. NO. ______ DWG ______ REV. ____

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________ SER. NO. ______ CAL DATE
NAME ____________ SER. NO. ______ CAL DATE

CONDUCTED BY ____________ NAME/AFFILIATION
APPROVED BY ____________ NAME/AFFILIATION

Step	Parameter	Specification	Results
12	Resistance	NMT 2 ohms	

DATE 12 APR 66

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

JDC 05417 REV. E PAGE 1 OF 3

INITIAL TDRR 27956 D.S. PGS 1

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Procedure for installing and removing the computer (with handling fixture) in the Operation Console

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	10-13-66	31503	All	-	EA	-
B	6-30-67	34036	All	-	EA	-
C	10-20-67	34889	All	-	EA	-
D	4-25-68	36128	All	-	EA 60	-
E	9-26-68	36862	1	-	EA	-

REFERENCES GSE Cabling Instructions, JDC 05415; NASA Drawing No. 2016402; AGC Handling Fixture, JDC 05111 and JDC 05121

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL
Torque wrench, 0-25 inch-pounds; Multimeter, Simpson 260 or equivalent

IMPORTANT

Installation and removal of the computer in the Operation Console requires two men. Refer to JDC 18100 for lubrication instructions prior to engaging any screw or bolt into header helicoil inserts, and for helicoil insert cleaning instructions after all testing has been completed or prior to spacecraft installation.

INSTALLATION

1. On the Operation Console (AC Input panel) set the STA POWER circuit breaker to the OFF position.

2. On the Computer Test Set (AC Input panel) set the STA POWER circuit breaker to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

3. Disconnect and remove W226 cable from the Buffer Circuit Assembly, and W227 from the Operation Console AGC Junction. (Refer to JDC 05415.)

4. Unlock and slide the Test Mount Drawer Assembly all the way out.

5. Remove the AGC Handling Fixture reinforcing plate from the computer, referencing JDC 05111, or, if protective cover is installed, reference JDC 05121.

6. With one man at each AGC Handling Fixture sling handle, lift and place the computer on the Test Mount Drawer Assembly.

7. Center the computer on the drawer assembly with the connector end of the computer to the front of the assembly.

8. Attach ground strap Part No. 2014457-051 between E6 of the Operation Console coldplate and a screw storage hole in the AGC Handling Fixture sling handle. Insure that the screw does not bottom out against the computer.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 APR 66

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

JDC 05417 REV E PAGE 2 OF 3

SUBSYSTEM Computer

ASSY

9. Remove the protective cover from the computer interface connector J1 (A51) and retain the cover and hardware.

9A. Carefully remove the protective cover assembly (2003099) from the test connector (A52). Turn each screw 1/2 turn at a time to insure even release of the connector cover and to avoid bending the Malco pins.

CAUTION: Store the test connector cover assembly safely so that the Malco pins will not be accidentally broken or bent.

10. Refer to GSE Cabling Instructions JDC 05415. Connect W226 and W227 cables to the computer.

11. Release the slide lock devices and slide the test mount drawer in as far as it will go. Lock the drawer in.

11A. Refer to JDC 05415. Connect W226 cable to the Buffer Circuit Assembly and W227 cable to the Operation Console AGC Junction.

12. Using a multimeter, measure the resistance between the computer case and the 0 VDC return line terminal E1 on the 28 VDC power supply of the Operation Console. Resistance NMT 2 ohms. Record on data sheet.

13. Refer to NASA Drawing No. 2016402. Insure ground strap Part No. 2014457-041 is installed between E6 of the Operation Console coldplate and E1 of the Buffer Circuit Assembly.

REMOVAL

14. On the Operation Console (AC Input panel) set the STA POWER circuit breaker to the OFF position.

15. On the Computer Test Set (AC Input panel) set the STA POWER circuit breaker to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

16. Disconnect W226 cable from the Buffer Circuit Assembly and W227 cable from the Operation Console AGC Junction.

17. Unlock and slide Test Mount Drawer Assembly all the way out.

18. Disconnect and remove W226 and W227 cables from computer.

19. Deleted.

19A. Remove ground strap Part No. 2014457-051 from the screw storage hole in the AGC Handling Fixture sling handle.

20. Install the protective cover on the computer J1 (A51) interface connector.

20A. Check the test connector cover assembly for bent pins prior to replacement. Replace the cover assembly on the test connector turning each captive screw 1/2 turn at a time. Torque all four screws to 18-22 inch-pounds.

DATE 12 APR 66

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

JDC 05417 REV E PAGE 3 OF 3

SUBSYSTEM Computer

ASSY

21. With one man at each AGC Handling Fixture sling handle, lift the computer off the Test Mount Drawer Assembly.

CAUTION: Do not use AGC Handling Fixture (2014282-021) for shipment or during pressure testing of AGC. Prevent bowing of AGC tray A during shipment or pressure testing by using AGC Handling Fixture (2014282-031).

NOTE: If AGC Handling Fixture (2014282-031) is to be utilized, install the reinforcing plate (2016461) on the computer per JDC 05111. If the AGC Handling Fixture (2014282-021) is to be utilized, perform step 21A.

21A. Place protective cover on the bottom of the computer snapping it in place on the AGC Handling Assembly.

22. Place the computer on the computer shelf of the G&N transportation cart.

23. Release the slide lock on the Test Mount Drawer and slide drawer in as far as it will go. Lock the drawer in.

DATE 12 APR 66

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC NO. 05417
REV. E
INITIAL TDRR 27956

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
12	Resistance	NMT 2 ohms	

DATE 12 APR 66

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

JDC 05417 REV. - PAGE 1 OF 2
INITIAL TDRR 27956 D.S. PGS 1

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Procedure for installing and removing the computer (with handling fixture) in the Operation Console

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
GSE Cabling Instructions, JDC 05415
NASA Drawing No. 2014358

IMPORTANT See note preceeding instructions

INTERVAL

TOOLS AND MATERIAL

NOTE: Installation and removal of the computer in the Operation Console requires two men.

INSTALLATION

1. On the Operation Console (AC Input panel) set the STA POWER circuit breaker to the OFF position.

2. On the Computer Test Set (AC Input panel) set the STA POWER circuit breaker to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

3. Disconnect and remove cables W226 and W227 from the Operation Console. (Refer to GSE Cabling Instructions JDC 05415.)

4. Unlock and slide the Test Mount Drawer Assembly all the way out.

5. With one man at each handle lift the computer and remove the protective cover from the bottom by unsnapping it.

6. Place the computer on the Test Mount Drawer Assembly.

7. Remove the handling fixture from the front of the computer. This is the end without the connectors on it.

8. Center the computer on the drawer assembly with the rear of the computer to the front of the assembly.

9. Remove the protective covers from the computer connectors.

10. Refer to GSE Cabling Instructions JDC 05415. Connect W226 and W227 to the computer and the console.

11. Release the slide lock devices and slide the test mount drawer in as far as it will go. Lock the drawer in.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

JDC 05417 REV - PAGE 2 OF 2

SUBSYSTEM Computer

ASSY

12. Using a multimeter, measure the resistance between the computer case and the 0 vdc return line terminal E1 on the 28 vdc power supply of the Operation Console. Record on data sheet.

13. Refer to Drawing No. 2014358. Attach ground strap Part No. 2014457-011 to the computer.

REMOVAL

14. On the Operation Console (AC Input panel) set the STA POWER circuit breaker to the OFF position.

15. On the Computer Test Set (AC Input panel) set the STA POWER circuit breaker to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

16. Refer to NASA Drawing No. 2014358. Remove ground strap Part No. 2014457.

17. Unlock and slide Test Mount Drawer Assembly part way out.

18. Disconnect and remove W226 and W227.

19. Slide drawer all the way out. Assemble the front AGC Handling Assembly to the computer.

20. Place the protective covers on the computer connectors.

21. Lift the computer off the Test Mount Drawer Assembly and place protective cover on the bottom of the computer snapping it in place on the AGC Handling Assembly.

22. Place the computer on the computer shelf of the G&N transportation cart.

23. Release the slide lock on the Test Mount Drawer and slide drawer in as far as it will go. Lock the drawer in.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05417
REV. -
INITIAL TDRF 27956

JOB COMPUTER INSTALLATION AND REMOVAL PROCEDURE - BLOCK II AND LEM

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
12	Resistance	NMT 2 ohms	

DATE ______

JOB CSS PRIMARY POWER TURN-ON PROCEDURE - BLOCK II AND LEM

JDC 05419 **REV.** A **PAGE** 1 **OF** 3

INITIAL TDRR 27956 **D.S. PGS** 0

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Subsystem test initial switch settings and application of primary power

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	11-10-66	31906	1, 2	-	EA	-

REFERENCES

IMPORTANT Verify that the applicable sections of JDC's 05415 through 05418 have been completed before performing this JDC.

INTERVAL As required

TOOLS AND MATERIAL

EQUIPMENT SET-UP

1. Set the STA POWER circuit breaker on the Computer Test Set (AC Input Panel) to the OFF position.

2. Set the AUX OUTLETS circuit breaker on the Computer Test Set (AC Input Panel) to the OFF position.

3. Set the STA POWER circuit breaker on the Operation Console (AC Input Panel) to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

INITIAL SWITCH SETTINGS

4. On the Power Control panel of the Computer Test Set:

a. Set the TEST SET switch to the OFF position.

b. Set the STATION power switch to the OFF position.

c. Set the VOLTAGE SELECT switch to the OFF position.

d. Set the AGC VOLTAGE switches to the OFF position.

e. Set the AGC VOLTAGE CONTRL 1 and CONTRL 2 controls to the LO position (fully counterclockwise).

f. Set the ACVM switch to the OFF position.

g. Set the RANGE SELECT switch to the 40V position.

h. Set the scale selector switch on the AC voltmeter panel to the 500 position.

5. Set the POWER switch on the Frequency Counter of the Computer Test Set to the OFF position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

6. Set the SCALE ILLUM switch on the Oscilloscope of the Computer Test Set to the OFF position.

7. On the Power Supply panel of the Computer Test Set:

a. Set the 10 VDC power switch to the ON position.

b. Set the 28 VDC power switch to the ON position.

c. Set the 13 VDC power switch to the ON position.

8. On the Power Supply 3 VDC panel of the Computer Test Set:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

9. On the Tape Perforator of the Computer Test Set, set the power switch to the OFF position.

10. On the Tape Reader of the Computer Test Set, set the power switch to the OFF position.

11. On the Power Control panel of the Operation Console:

a. Set the CONSOLE switch to the OFF position.

b. Set the AGC MARGINS switch to the NORM position.

c. Set the AGC CURRENT switch to the OFF position.

d. Set the DSKY KEYBOARD VOLTAGE switch to the OFF position.

e. Set the UNIVERSAL DSKY DIMMERS (MAIN REGISTER, NAV REGISTER, MAIN-NAV ALARMS, MAIN-NAV KEYBOARDS) controls fully counterclockwise.

f. Set the DCVM switch to the 40V position.

g. Set the DCVM MONITOR switch to the ZERO position.

12. On the Power Supply 5 VDC panel of the Operation Console:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

13. On the Power Supply 28 VDC panel of the Computer Test Set:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

14. On the 115 VAC 400 cycle Power Supply panel of the Operation Console:

a. Set the INVERTER switch to the ON position.

b. Set the AGC circuit breaker to the ON position.

15. On the Power Supply 28 VDC panel of the 115 VAC 400 cycle Power Supply panel of the Operation Console:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

16. Set the POWER switch on the Recorder of the AGC Calibration System to the OFF position.

17. Set the POWER switch on the Electronic Counter of the AGC Calibration System to the OFF position.

18. Set the POWER switch on the Phase Comparator Receiver (VLF) of the AGC Calibration System to the ON position.

19. Set the DC MODE switch on the Frequency Calibrator of the AGC Calibration System to the NORM position.

20. Set the power switch on the Digital Ohmmeter on the AGC Calibration System to the OFF position.

21. Set the STA POWER circuit breaker on the Computer Test Set (AC Input Panel) to the ON position.

22. Set the AUX OUTLETS circuit breaker on the Computer Test Set (AC Input Panel) to the ON position.

23. Set the STA POWER circuit breaker on the Operation Console (AC Input Panel) to the ON position.

CSS PRIMARY POWER TURN-ON
JOB PROCEDURE - BLOCK II AND LEM

JDC 05419 REV. B PAGE 1 OF 3
INITIAL TDRR 27956 D.S. PGS 0

SUBSYSTEM Computer
ASSY.
DESCRIPTION

Subsystem test initial switch settings and application of primary power

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	11-10-66	31906	1, 2	-	EA	-
B	9-7-67	34521	All	-	EA	-

REFERENCES

IMPORTANT Verify that the applicable sections of JDC's 05415 through 05418 have been completed before performing this JDC.

INTERVAL As required

TOOLS AND MATERIAL

EQUIPMENT SET-UP

1. Set the STA POWER circuit breaker on the Computer Test Set (AC Input Panel) to the OFF position.

2. Set the AUX OUTLETS circuit breaker on the Computer Test Set (AC Input Panel) to the OFF position.

3. Set the STA POWER circuit breaker on the Operation Console (AC Input Panel) to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

INITIAL SWITCH SETTINGS

4. On the Power Control panel of the Computer Test Set:

a. Set the TEST SET switch to the OFF position.

b. Set the STATION power switch to the OFF position.

c. Set the VOLTAGE SELECT switch to the OFF position.

d. Set the AGC VOLTAGE switches to the OFF position.

e. Set the AGC VOLTAGE CONTROL 1 control to 1 and the AGC VOLTAGE CONTROL 2 control to 2.

f. Set the ACVM switch to the OFF position.

g. Set the RANGE SELECT switch to the 40V position.

h. Set the scale selector switch on the AC voltmeter panel to the 500 position.

5. On Logic Drawer 2 of the Computer Test Set:

a. Set COUNTER STOP T12 switch to the ON position.

---

b. Set INHIBIT INTERRUPTS switch to the ON position.

c. Set INCREMENTS INHIBIT switch to the ON position.

6. On the Buffer Circuit Assembly set the STRT 1/STRT 2 switch to the ON position.

7. Set the POWER switch on the Frequency Counter of the Computer Test Set to the OFF position.

8. Set the SCALE ILLUM switch on the Oscilloscope of the Computer Test Set to the OFF position.

9. On the Power Supply panel of the Computer Test Set:

a. Set the 10 VDC power switch to the ON position.

b. Set the 28 VDC power switch to the ON position.

c. Set the 13 VDC power switch to the ON position.

10. On the Power Supply 3 VDC panel of the Computer Test Set:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

11. On the Tape Perforator of the Computer Test Set, set the power switch to the OFF position.

12. On the Tape Reader of the Computer Test Set, set the power switch to the OFF position.

13. On the Power Control panel of the Operation Console:

a. Set the CONSOLE switch to the OFF position.

b. Set the AGC MARGINS switch to the NORM position.

c. Set the AGC CURRENT switch to the OFF position.

d. Set the DSKY KEYBOARD VOLTAGE switch to the OFF position.

e. Set the UNIVERSAL DSKY DIMMERS (MAIN REGISTER, NAV REGISTER, MAIN-NAV ALARMS, MAIN-NAV KEYBOARDS) controls fully counterclockwise.

f. Set the DCVM switch to the 40V position.

g. Set the DCVM MONITOR switch to the ZERO position.

14. On the Power Supply 5 VDC panel of the Operation Console:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

15. On the Power Supply 28 VDC panel of the Computer Test Set:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

16. On the 115 VAC 400 cycle Power Supply panel of the Operation Console:

a. Set the INVERTER switch to the ON position.

b. Set the AGC circuit breaker to the ON position.

17. On the Power Supply 28 VDC panel of the 115 VAC 400 cycle Power Supply panel of the Operation Console:

a. Set the POWER switch to the ON position.

---

b. Set the regulator switch to the VOLTAGE REGULATED position.

18. Set the POWER switch on the Recorder of the AGC Calibration System to the OFF position.

19. Set the POWER switch on the Electronic Counter of the AGC Calibration System to the OFF position.

NOTE: Omit steps 20 and 21 if an Auxiliary Calibration System is being used.

20. Set the POWER switch on the Phase Comparator Receiver (VLF) of the AGC Calibration System to the ON position.

21. Set the DC MODE switch on the Frequency Calibrator of the AGC Calibration System to the NORM position.

22. Set the power switch on the Digital Ohmmeter on the AGC Calibration System to the OFF position.

23. Set the STA POWER circuit breaker on the Computer Test Set (AC Input Panel) to the ON position.

24. Set the AUX OUTLETS circuit breaker on the Computer Test Set (AC Input Panel) to the ON position.

25. Set the STA POWER circuit breaker on the Operation Console (AC Input Panel) to the ON position.

CSS PRIMARY POWER TURN-ON
JOB PROCEDURE - BLOCK II AND LEM

JDC 05419 REV. C PAGE 1 OF 3
INITIAL TDRR 27956 D.S. PGS 0

SUBSYSTEM Computer
ASSY.

DESCRIPTION

Subsystem test initial switch settings and application of primary power

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	11-10-66	31906	1,2	-	EA	-
B	9-7-67	34521	All	-	EA	-
C	3-22-68	35900	2,3	-	EA	-

REFERENCES

IMPORTANT Verify that the applicable sections of JDC's 05415 through 05418 have been completed before performing this JDC.

INTERVAL As required

TOOLS AND MATERIAL

EQUIPMENT SET-UP

1. Set the STA POWER circuit breaker on the Computer Test Set (AC Input Panel) to the OFF position.

2. Set the AUX OUTLETS circuit breaker on the Computer Test Set (AC Input Panel) to the OFF position.

3. Set the STA POWER circuit breaker on the Operation Console (AC Input Panel) to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

INITIAL SWITCH SETTINGS

4. On the Power Control panel of the Computer Test Set:

a. Set the TEST SET switch to the OFF position.

b. Set the STATION power switch to the OFF position.

c. Set the VOLTAGE SELECT switch to the OFF position.

d. Set the AGC VOLTAGE switches to the OFF position.

e. Set the AGC VOLTAGE CONTROL 1 control to 1 and the AGC VOLTAGE CONTROL 2 control to 2.

f. Set the ACVM switch to the OFF position.

g. Set the RANGE SELECT switch to the 40V position.

h. Set the scale selector switch on the AC voltmeter panel to the 500 position.

5. On Logic Drawer 2 of the Computer Test Set:

a. Set COUNTER STOP T12 switch to the ON position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

---

b. Set INHIBIT INTERRUPTS switch to the ON position.

c. Set INCREMENTS INHIBIT switch to the ON position.

6. On the Buffer Circuit Assembly set the STRT 1/STRT 2 switch to the ON position.

7. Set the POWER switch on the Frequency Counter of the Computer Test Set to the OFF position.

8. Set the SCALE ILLUM switch on the Oscilloscope of the Computer Test Set to the OFF position.

9. On the Power Supply panel of the Computer Test Set:

a. Set the 10 VDC power switch to the ON position.

b. Set the 28 VDC power switch to the ON position.

c. Set the 13 VDC power switch to the ON position.

10. On the Power Supply 3 VDC panel of the Computer Test Set:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

11. On the Tape Perforator of the Computer Test Set, set the power switch to the OFF position.

12. On the Tape Reader of the Computer Test Set, set the power switch to the OFF position.

13. On the Power Control panel of the Operation Console:

a. Set the CONSOLE switch to the OFF position.

b. Set the AGC MARGINS switch to the NORM position.

c. Set the AGC CURRENT switch to the OFF position.

d. Set the DSKY KEYBOARD VOLTAGE switch to the OFF position.

e. Set the UNIVERSAL DSKY DIMMERS (MAIN REGISTER, NAV REGISTER, MAIN-NAV ALARMS, MAIN-NAV KEYBOARDS) controls fully counterclockwise.

f. Set the DCVM switch to the 40V position.

g. Set the DCVM MONITOR switch to the ZERO position.

14. On the Power Supply 5 VDC panel of the Operation Console:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

15. On the Power Supply 28 VDC panel of the Operation Console:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

16. On the 115 VAC 400 cycle Power Supply panel of the Operation Console:

a. Set the INVERTER switch to the ON position.

b. Set the AGC circuit breaker to the ON position.

17. On the Power Supply 28 VDC panel of the 115 VAC 400 cycle Power Supply panel of the Operation Console:

a. Set the POWER switch to the ON position.

---

b. Set the regulator switch to the VOLTAGE REGULATED position.

18. Set the POWER switch on the Recorder of the AGC Calibration System to the OFF position.

19. Set the POWER switch on the Electronic Counter of the AGC Calibration System to the OFF position.

NOTE: Omit steps 20 and 21 if an Auxiliary Calibration System is being used.

20. Set the POWER switch on the Phase Comparator Receiver (VLF) of the AGC Calibration System to the ON position.

21. Set the DC switch on the Frequency Calibrator of the AGC Calibration System to the NORM position.

22. Set the power switch on the Digital Ohmmeter on the AGC Calibration System to the OFF position.

23. Set the STA POWER circuit breaker on the Computer Test Set (AC Input Panel) to the ON position.

24. Set the AUX OUTLETS circuit breaker on the Computer Test Set (AC Input Panel) to the ON position.

25. Set the STA POWER circuit breaker on the Operation Console (AC Input Panel) to the ON position.

CSS PRIMARY POWER TURN-ON
JOB PROCEDURE - BLOCK II AND LEM

JDC 05419 **REV.** - **PAGE** 1 **OF** 3
INITIAL TDRR 27956 **C.S. PGS** 0

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Subsystem test initial switch settings and application of primary power

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

EQUIPMENT SET-UP

1. Set the STA POWER circuit breaker on the Computer Test Set (AC Input Panel) to the OFF position.

2. Set the AUX OUTLETS circuit breaker on the Computer Test Set (AC Input Panel) to the OFF position.

3. Set the STA POWER circuit breaker on the Operation Console (AC Input Panel) to the OFF position.

CAUTION: Do not deenergize the AGC Calibration System.

INITIAL SWITCH SETTINGS

4. On the Power Control panel of the Computer Test Set:

a. Set the TEST SET switch to the OFF position.

b. Set the STATION power switch to the OFF position.

c. Set the VOLTAGE SELECT switch to the OFF position.

d. Set the AGC VOLTAGE switches to the OFF position.

e. Set the AGC VOLTAGE CONTRL 1 and CONTRL 2 controls to the LO position (fully counterclockwise).

f. Set the ACVM switch to the OFF position.

g. Set the RANGE SELECT switch to the 40V position.

h. Set the scale selector switch on the AC voltmeter panel to the 500 position.

5. Set the POWER switch on the Frequency Counter of the Computer Test Set to the OFF position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

CSS PRIMARY POWER TURN-ON
JOB PROCEDURE - BLOCK II AND LEM

JDC 05419 **REV** - **PAGE** 2 **OF** 3

SUBSYSTEM Computer

ASSY

6. Set the SCALE ILLUM switch on the Oscilloscope of the Computer Test Set to the OFF position.

7. On the Power Supply panel of the Computer Test Set:

a. Set the 10 VDC power switch to the ON position.

b. Set the 28 VDC power switch to the ON position.

c. Set the 13 VDC power switch to the ON position.

8. On the Power Supply 3 VDC panel of the Computer Test Set:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

9. On the Tape Perforator of the Computer Test Set, set the power switch to the OFF position.

10. On the Tape Reader of the Computer Test Set, set the power switch to the OFF position.

11. On the Power Control panel of the Operation Console:

a. Set the CONSOLE switch to the OFF position.

b. Set the AGC MARGINS switch to the NORM position.

c. Set the AGC CURRENT switch to the OFF position.

d. Set the DSKY KEYBOARDS VOLTAGE switch to the OFF position.

e. Set the UNIVERSAL DSKY DIMMERS (MAIN REGISTER, NAV REGISTER, MAIN-NAV ALARMS, MAIN-NAV KEYBOARDS) controls fully counterclockwise.

f. Set the DCVM switch to the 40V position.

g. Set the DCVM MONITOR switch to the OFF position.

12. On the Power Supply 5 VDC panel of the Operation Console:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

13. On the Power Supply 28 VDC panel of the Computer Test Set:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

14. On the 115 VAC 400 cycle Power Supply panel of the Operation Console:

a. Set the INVERTER switch to the ON position.

b. Set the AGC circuit breaker to the ON position.

15. On the Power Supply 28 VDC panel of the 115 VAC 400 cycle Power Supply panel of the Operation Console:

a. Set the POWER switch to the ON position.

b. Set the regulator switch to the VOLTAGE REGULATED position.

DATE ______

CSS PRIMARY POWER TURN-ON
JOB PROCEDURE - BLOCK II AND LEM

JDC 05419 **REV** - **PAGE** 3 **OF** 3

SUBSYSTEM Computer

ASSY

16. Set the POWER switch on the Recorder of the AGC Calibration System to the OFF position.

17. Set the POWER switch on the Electronic Counter of the AGC Calibration System to the OFF position.

18. Set the POWER switch on the Phase Comparator Receiver (VLF) of the AGC Calibration System to the ON position.

19. Set the DC MODE switch on the Frequency Calibrator of the AGC Calibration System to the NORM position.

20. Set the power switch on the Digital Ohmmeter on the AGC Calibration System to the OFF position.

21. Set the STA POWER circuit breaker on the Computer Test Set (AC Input Panel) to the ON position.

22. Set the AUX OUTLETS circuit breaker on the Computer Test Set (AC Input Panel) to the ON position.

23. Set the STA POWER circuit breaker on the Operation Console (AC Input Panel) to the ON position.

DATE ______

JOB CSS POWER TURN-ON AND TURN-OFF PROCEDURE - BLOCK II AND LEM

JDC 05420 REV. A PAGE 1 OF 3
INITIAL TDRR 27956 D.S. PGS. 1

SUBSYSTEM Computer
ASSY.

DESCRIPTION

Subsystem test power turn-on and turn-off procedure

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-7-67	34522	2	All	EA	-

REFERENCES JDC 05419

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

POWER TURN-ON

1. Perform the Initial Switch Settings section of Computer Test Set-Up - Block II, JDC 05419.

2. Set the POWER switch on the Recorder of the AGC Calibration System to the ON position.

3. Set the POWER switch on the Electronic Counter of the AGC Calibration System to the ON position.

NOTE: Allow 45 minutes for the crystal oven to stabilize before making any measurements.

4. Insure that the POWER switch on the Phase Comparator Receiver (VLF) of the AGC Calibration System is set to the ON position.

5. Set the power switch on the Digital Ohmmeter of the AGC Calibration System to the ON position.

6. On the Power Control panel of the Computer Test Set:

a. Set the STATION switch to the ON position and observe that the STATION lamp is illuminated.

b. Set the TEST SET switch to the ON position and observe that the TEST SET lamp is illuminated.

7. Set the POWER switch on the Frequency Counter of the Computer Test Set to the ON position.

NOTE: Allow approximately 3 hours for the crystal oven to stabilize before making any measurements.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

JOB CSS POWER TURN-ON AND TURN-OFF PROCEDURE - BLOCK II AND LEM

JDC 05420 REV A PAGE 2 OF 3

SUBSYSTEM Computer
ASSY

8. Turn the SCALE ILLUM control on the Oscilloscope of the Computer Test Set clockwise out of the OFF position.

9. Set the VOLTAGE SELECT switch on the Power Control panel of the Computer Test Set to the following positions and monitor the voltage on the Power Control panel voltmeter. Record on data sheet.

a. CTS 3V

b. CTS 10V

10. On the Power Control panel of the Operation Console:

a. Set the CONSOLE switch to ON and observe that CONSOLE lamp is illuminated.

b. Depress and release CONSOLE 28 VDC ON annunciator. Observe that annunciator illuminates.

c. Set DCVM MONITOR switch to the AGC -28V position. Record DCVM indication on data sheet.

d. Depress and release AGC ON annunciator. Observe that annunciator illuminates.

e. Set DCVM MONITOR switch to the AGC -28VA position. Record DCVM indication on data sheet.

f. Set DCVM MONITOR switch to the AGC -28VB position. Record DCVM indication on data sheet.

g. Set AGC CURRENT switch to the 5A position. Record ammeter indication on data sheet.

h. Depress and release MAIN DSKY ALARM-KB ON annunciator. Observe that annunciator illuminates.

NOTE: Omit step k if this procedure is being performed during LEM CSS checkout.

i. Depress and release NAV DSKY ALARM-KB ON annunciator. Observe that annunciator illuminates.

j. Set DSKY KEYBOARDS VOLTAGE switch to the 140V position and adjust UNIVERSAL DSKY DIMMER (MAIN-NAV KEYBOARDS) control for an indication of 0 VAC. Record. Adjust UNIVERSAL DSKY DIMMER (MAIN ALARMS) controls as required for a display on the DSKY's.

k. Set DSKY KEYBOARDS VOLTAGE switch to the OFF position.

11. On the Power Control panel of the Computer Test Set:

a. Set the VOLTAGE SELECT switch to the AGC (+4) +3V position. Record voltmeter indication on data sheet.

b. Set the VOLTAGE SELECT switch to the AGC (+14V) +13V position. Record voltmeter indication on data sheet.

POWER TURN-OFF

12. On the Power Control panel of the Operation Console:

NOTE: Omit step a if this procedure is being performed during LEM CSS checkout.

a. Depress and release NAV DSKY ALARM-KB OFF annunciator.

b. Depress and release MAIN DSKY ALARM-KB OFF annunciator.

c. Depress and release AGC OFF annunciator.

JOB CSS POWER TURN-ON AND TURN-OFF PROCEDURE - BLOCK II AND LEM

JDC 05420 REV A PAGE 3 OF 3

SUBSYSTEM Computer
ASSY

d. Depress and release CONSOLE 28 VDC OFF annunciator.

13. Set the power switch on the Digital Ohmmeter of the AGC Calibration System to the OFF position.

14. Set the POWER switch on the Electronic Counter of the AGC Calibration System to the OFF position.

15. Set the POWER switch on the Recorder of the AGC Calibration System to the OFF position.

16. Leave the POWER switch on the Phase Comparator Receiver (VLF) of the AGC Calibration System in the ON position.

17. Set the CONSOLE switch on the Power Control panel of the Operation Console to the OFF position.

18. Turn the SCALE ILLUM control of the Oscilloscope of the Computer Test Set fully counterclockwise to the OFF position.

19. Set the POWER switch on the Frequency Counter of the Computer Test Set to the OFF position.

20. On the Power Control panel of the Computer Test Set:

a. Set the TEST SET switch to the OFF position.

b. Set the STATION switch to the OFF position.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC NO. 05420
REV. A
INITIAL TDRR 27956

JOB CSS POWER TURN-ON AND TURN-OFF PROCEDURE - BLOCK II AND LEM

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ ______ CAL DATE
NAME ______ SER. NO. ______ ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION
APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
9.a	CTS 3V Voltage	4.60 ± 0.30 vdc	
9.b	CTS 10V Voltage	10.00 ± 0.20 vdc	
10.c	AGC -28V Voltage	28.0 ±0.5 vdc	
10.e	AGC -28VA Voltage	28.0 ± 1.1 vdc	
10.f	AGC -28VB Voltage	28.0 ± 1.1 vdc	
10.g	5A Current	NMT 4.5 amperes	
10.j	140V Voltage	0 vac	
11.a	AGC (+4) +3V Voltage	4.0 ± 0.5 vdc	
11.b	AGC (+14V) +13V Voltage	14.0 ± 1.0 vdc	

JOB CSS POWER TURN-ON AND TURN-OFF PROCEDURE - BLOCK II AND LEM

JDC 05420 REV. B PAGE 1 OF 3

INITIAL TDRR 27956 D.S. PGS 1

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Subsystem test power turn-on and turn-off procedure

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-7-67	34522	2	All	EA	-
B	4-26-68	36139	2	1	EA	-

REFERENCES JDC 05419

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

POWER TURN-ON

1. Perform the Initial Switch Settings section of Computer Test Set-Up - Block II, JDC 05419.

2. Set the POWER switch on the Recorder of the AGC Calibration System to the ON position.

3. Set the POWER switch on the Electronic Counter of the AGC Calibration System to the ON position.

NOTE: Allow 45 minutes for the crystal oven to stabilize before making any measurements.

4. Insure that the POWER switch on the Phase Comparator Receiver (VLF) of the AGC Calibration System is set to the ON position.

5. Set the power switch on the Digital Ohmmeter of the AGC Calibration System to the ON position.

6. On the Power Control panel of the Computer Test Set:

a. Set the STATION switch to the ON position and observe that the STATION lamp is illuminated.

b. Set the TEST SET switch to the ON position and observe that the TEST SET lamp is illuminated.

7. Set the POWER switch on the Frequency Counter of the Computer Test Set to the ON position.

NOTE: Allow approximately 3 hours for the crystal oven to stabilize before making any measurements.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

JOB CSS POWER TURN-ON AND TURN-OFF PROCEDURE - BLOCK II AND LEM

JDC 05420 REV B PAGE 2 OF 3

SUBSYSTEM Computer

ASSY

8. Turn the SCALE ILLUM control on the Oscilloscope of the Computer Test Set clockwise out of the OFF position.

9. Set the VOLTAGE SELECT switch on the Power Control panel of the Computer Test Set to the following positions and monitor the voltage on the Power Control panel voltmeter. Record on data sheet.

a. CTS 3V

b. CTS 10V

10. On the Power Control panel of the Operation Console:

a. Set the CONSOLE switch to ON and observe that CONSOLE lamp is illuminated.

b. Depress and release CONSOLE 28 VDC ON annunciator. Observe that annunciator illuminates.

c. Set DCVM MONITOR switch to the AGC -28V position. Record DCVM indication on data sheet.

d. Depress and release AGC ON annunciator. Observe that annunciator illuminates.

e. Set DCVM MONITOR switch to the AGC -28VA position. Record DCVM indication on data sheet.

f. Set DCVM MONITOR switch to the AGC -28VB position. Record DCVM indication on data sheet.

g. Set AGC CURRENT switch to the 5A position. Record ammeter indication on data sheet.

h. Depress and release MAIN DSKY ALARM-KB ON annunciator. Observe that annunciator illuminates.

NOTE: Omit step i if this procedure is being performed using only one DSKY.

i. Depress and release NAV DSKY ALARM-KB ON annunciator. Observe that annunciator illuminates.

j. Set DSKY KEYBOARDS VOLTAGE switch to the 140V position and adjust UNIVERSAL DSKY DIMMERS (MAIN-NAV KEYBOARDS) control for a minimum indication. Record. Adjust UNIVERSAL DSKY DIMMERS (MAIN-NAV ALARMS) controls as required for a display on the DSKY(s).

k. Set DSKY KEYBOARDS VOLTAGE switch to the OFF position.

11. On the Power Control panel of the Computer Test Set:

a. Set the VOLTAGE SELECT switch to the AGC (+4) +3V position. Record voltmeter indication on data sheet.

b. Set the VOLTAGE SELECT switch to the AGC (+14V) +13V position. Record voltmeter indication on data sheet.

POWER TURN-OFF

12. On the Power Control panel of the Operation Console:

NOTE: Omit step a if this procedure is being performed using only one DSKY.

a. Depress and release NAV DSKY ALARM-KB OFF annunciator.

b. Depress and release MAIN DSKY ALARM-KB OFF annunciator.

c. Depress and release AGC OFF annunciator.

JOB CSS POWER TURN-ON AND TURN-OFF PROCEDURE - BLOCK II AND LEM

JDC 05420 REV B PAGE 3 OF 3

SUBSYSTEM Computer

ASSY

d. Depress and release CONSOLE 28 VDC OFF annunciator.

13. Set the power switch on the Digital Ohmmeter of the AGC Calibration System to the OFF position.

14. Set the POWER switch on the Electronic Counter of the AGC Calibration System to the OFF position.

15. Set the POWER switch on the Recorder of the AGC Calibration System to the OFF position.

16. Leave the POWER switch on the Phase Comparator Receiver (VLF) of the AGC Calibration System in the ON position.

17. Set the CONSOLE switch on the Power Control panel of the Operation Console to the OFF position.

18. Turn the SCALE ILLUM control of the Oscilloscope of the Computer Test Set fully counterclockwise to the OFF position.

19. Set the POWER switch on the Frequency Counter of the Computer Test Set to the OFF position.

20. On the Power Control panel of the Computer Test Set:

a. Set the TEST SET switch to the OFF position.

b. Set the STATION switch to the OFF position.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC NO. 05420
REV. B
INITIAL TDRR 27956

JOB CSS POWER TURN-ON AND TURN-OFF PROCEDURE - BLOCK II AND LEM

ASSEMBLY UNDER TEST

TITLE ____

SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION

TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE

NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
9.a	CTS 3V Voltage	4.60 ± 0.30 vdc	
9.b	CTS 10V Voltage	10.00 ± 0.20 vdc	
10.c	AGC -28V Voltage	28.0 ±0.5 vdc	
10.e	AGC -28VA Voltage	28.0 ± 1.1 vdc	
10.f	AGC -28VB Voltage	28.0 ± 1.1 vdc	
10.g	5A Current	NMT 4.5 amperes	
10.j	140V Voltage	Minimum indication	
11.a	AGC (+4) +3V Voltage	4.0 ± 0.5 vdc	
11.b	AGC (+14V) +13V Voltage	14.0 ± 1.0 vdc	

JOB CSS POWER TURN-ON AND TURN-OFF PROCEDURE - BLOCK II AND LEM

JDC 05420 REV. - PAGE 1 OF 3
INITIAL TDRR 27956 D.S. PGS 1

SUBSYSTEM Computer

ASSY.

DESCRIPTION

Subsystem test power turn-on and turn-off procedure

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES JDC 05419

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

POWER TURN-ON

1. Perform the Initial Switch Settings section of Computer Test Set-Up - Block II, JDC 05419.

2. Set the POWER switch on the Recorder of the AGC Calibration System to the ON position.

3. Set the POWER switch on the Electronic Counter of the AGC Calibration System to the ON position.

NOTE: Allow 45 minutes for the crystal oven to stabilize before making any measurements.

4. Insure that the POWER switch on the Phase Comparator Receiver (VLF) of the AGC Calibration System is set to the ON position.

5. Set the power switch on the Digital Ohmmeter of the AGC Calibration System to the ON position.

6. On the Power Control panel of the Computer Test Set:

a. Set the STATION switch to the ON position and observe that the STATION lamp is illuminated.

b. Set the TEST SET switch to the ON position and observe that the TEST SET lamp is illuminated.

7. Set the POWER switch on the Frequency Counter of the Computer Test Set to the ON position.

NOTE: Allow approximately 3 hours for the crystal oven to stabilize before making any measurements.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ________

CSS POWER TURN-ON AND TURN-OFF
JOB PROCEDURE - BLOCK II AND LEM

JDC 05420 REV - PAGE 2 OF 3

SUBSYSTEM Computer

ASSY

8. Turn the SCALE ILLUM control on the Oscilloscope of the Computer Test Set clockwise out of the OFF position.

9. Set the VOLTAGE SELECT switch on the Power Control panel of the Computer Test Set to the following positions and monitor the voltage on the Power Control panel voltmeter. Record on data sheet.

a. CTS 3V

b. CTS 10V

10. On the Power Control panel of the Operation Console:

a. Set the CONSOLE switch to ON and observe that CONSOLE lamp is illuminated.

b. Depress and release CONSOLE 28 VDC ON annunciator. Observe that annunciator illuminates.

c. Set DCVM MONITOR switch to the AGC -28V position. Record DCVM indication on data sheet.

d. Depress and release AGC ON annunciator. Observe that annunciator illuminates.

e. Set DCVM MONITOR switch to the AGC -28VA position. Record DCVM indication on data sheet.

f. Set DCVM MONITOR switch to the AGC -28VB position. Record DCVM indication on data sheet.

g. Set DCVM switch to the OFF position.

h. Set AGC CURRENT switch to the 5A position. Record ammeter indication on data sheet.

i. Set AGC CURRENT switch to the OFF position.

j. Depress and release MAIN DSKY ALARM-KB ON annunciator. Observe that annunciator illuminates.

NOTE: Omit step k if this procedure is being performed during LEM CSS checkout.

k. Depress and release NAV DSKY ALARM-KB ON annunciator. Observe that annunciator illuminates.

l. Set DSKY KEYBOARDS VOLTAGE switch to the 140V position. Record voltmeter indicaton on data sheet.

m. Set DSKY KEYBOARDS VOLTAGE switch to the OFF position.

11. On the Power Control panel of the Computer Test Set:

a. Set the VOLTAGE SELECT switch to the AGC (+4) +3V position. Record voltmeter indication on data sheet.

b. Set the VOLTAGE SELECT switch to the AGC (+14V) +13V position. Record voltmeter indication on data sheet.

c. Set the VOLTAGE SELECT switch to the OFF position.

POWER TURN-OFF

12. On the Power Control panel of the Operation Console:

NOTE: Omit step a if this procedure is being performed during LEM CSS checkout.

a. Depress and release NAV DSKY ALARM-KB OFF annunciator.

b. Depress and release MAIN DSKY ALARM-KB OFF annunciator.

c. Depress and release AGC OFF annunciator.

DATE ________

CSS POWER TURN-ON AND TURN-
JOB OFF PROCEDURE - BLOCK II AND LEM

JDC 05420 REV - PAGE 3 OF 3

SUBSYSTEM Computer

ASSY

d. Depress and release CONSOLE 28 VDC OFF annunciator.

13. Set the power switch on the Digital Ohmmeter of the AGC Calibration System to the OFF position.

14. Set the POWER switch on the Electronic Counter of the AGC Calibration System to the OFF position.

15. Set the POWER switch on the Recorder of the AGC Calibration System to the OFF position.

16. Leave the POWER switch on the Phase Comparator Receiver (VLF) of the AGC Calibration System in the ON position.

17. Set the CONSOLE switch on the Power Control panel of the Operation Console to the OFF position.

18. Turn the SCALE ILLUM control of the Oscilloscope of the Computer Test Set fully counterclockwise to the OFF position.

19. Set the POWER switch on the Frequency Counter of the Computer Test Set to the OFF position.

20. On the Power Control panel of the Computer Test Set:

a. Set the TEST SET switch to the OFF position.

b. Set the STATION switch to the OFF position.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC NO. 05420
REV. -
INITIAL TDRR 27956

JOB CSS POWER TURN-ON AND TURN-OFF PROCEDURE - BLOCK II AND LEM

ASSEMBLY UNDER TEST

TITLE ________

SER. NO. ________ DWG ________ REV. ________

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION

TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ CAL DATE

NAME ________ SER. NO. ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION   APPROVED BY ________ NAME/AFFILIATION

Step	Parameter	Specification	Results
9.a	CTS 3V Voltage	4.50 ± 0.10 vdc	
9.b	CTS 10V Voltage	10.00 ± 0.15 vdc	
10.c	AGC -28V Voltage	28.0 vdc	
10.e	AGC -28VA Voltage	28.0 ± 1.1 vdc	
10.f	AGC -28VB Voltage	28.0 ± 1.1 vdc	
10.h	5A Current	1.0 ± 0.1 ampere	
10.1	140V Voltage	115 ± 15 vac	
11.a	AGC (+4) +3V Voltage	4.0 ± 0.5 vdc	
11.b	AGC (+14V) +13V Voltage	14.0 ± 1.0 vdc	

DATE ________

JOB REGISTER S INHIBIT TEST

JDC 05450 **REV.** A **PAGE** 1 **OF** 3
INITIAL TDRR 31093 **D.S. PGS** 2

SUBSYSTEM BM-GSE CTS

ASSY. 2014042-031, - 041, -051

DESCRIPTION

Checkout Register S Inhibit Logic

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	4-6-67	33507	1	-	EA	-

REFERENCES
JDC 05130
ND-1021040, Chapter 5A

IMPORTANT

INTERVAL 180 days

TOOLS AND MATERIAL

PRELIMINARY

1. Ensure that the following switches are set to the positions indicated:

FEEDBACK TC	indicator on
ST1	indicator on
BLK-1	indicator off

2. Set switches and indicators on the self test panel as follows:

FEEDBACK LOAD	indicator on
WS	indicator on
WG4/WG	indicator on
T4	indicator on
T8	indicator off

3. Depress PROCEED pushbutton. STPIT indicator shall be out. Record.

4. Depress KEYBOARD LOAD pushbutton switch (indicator on).

5. Set AGREEMENT A digiswitches to XXXX1111.

6. Set AGREEMENT A SAMPLE switch to STOP. AGREEMENT indicator shall be out. Record.

7. Set register select switch to A.

PROCEDURE

8. Depress CL key.

9. Load RZ with 03333; load RA with 01111.

10. Verify that RZ register display indicates:

0000 011 011 011 011

11. Verify that the REG SEL register display indicates:

0000 001 001 001 001

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 15 SEP 66

JOB REGISTER S INHIBIT TEST

JDC 05450 **REV** A **PAGE** 2 **OF** 3

SUBSYSTEM BM-GSE CTS

ASSY 2014042-031, -041, -051

12. Set register select switch to S.

13. Depress and hold KEYBOARD LOAD and TRANSFER CONTROL pushbutton switches.

14. Depress EXECUTE.

15. Release TRANSFER CONTROL pushbutton switch.

16. Release KEYBOARD LOAD pushbutton switch (indicator on).

17. Verify that REG SEL register display indicates:

0000 001 001 001 001

18. Verify that RG register display indicates:

0000 011 011 011 011

19. Verify that AGREEMENT A indicator is on.

20. Verify that STPIT indicator is on.

21. Depress and hold KEYBOARD LOAD and TRANSFER CONTROL pushbutton switches.

22. Depress EXECUTE.

23. Release TRANSFER CONTROL pushbutton switch.

24. Release KEYBOARD LOAD pushbutton switch (indicator on).

25. Verify AGREEMENT A indicator is off.

26. Verify that STPIT indicator is off.

27. Verify that REG SEL register display indicates:

0000 011 011 011 011

28. Verify that RG register display indicates:

0000 011 011 011 011

29. Set AGREEMENT A SAMPLE switch to OFF.

30. Set AGREEMENT B digiswitches to XXXX2222.

31. Set AGREEMENT B SAMPLE switch to STOP.

32. Verify that AGREEMENT B indicator is off.

33. Set register select switch to A.

34. Depress CL key.

35. Load RZ with 05555; load RA with 02222.

36. Verify that RZ register display indicates:

0000 101 101 101 101

37. Verify that REG SEL register display indicates:

0000 010 010 010 010

38. Set register select switch to S.

39. Depress and hold KEYBOARD LOAD and TRANSFER CONTROL pushbutton switches.

40. Depress EXECUTE.

41. Release TRANSFER CONTROL pushbutton switch.

42. Release KEYBOARD LOAD pushbutton switch (indicator on).

DATE 15 SEP 66

JOB REGISTER S INHIBIT TEST

JDC 05450 **REV** A **PAGE** 3 **OF** 3

SUBSYSTEM BM-GSE CTS

ASSY 2014042-031, - 041, -051

43. Verify that REG SEL register display indicates:

0000 010 010 010 010

44. Verify that RG register display indicates:

0000 111 111 111 111

45. Verify that AGREEMENT B indicator is on.

46. Verify that STPIT indicator is on.

47. Depress and hold KEYBOARD LOAD and TRANSFER CONTROL pushbutton switches.

48. Depress EXECUTE.

49. Release TRANSFER CONTROL pushbutton switch.

50. Release KEYBOARD LOAD pushbutton switch (indicator on).

51. Verify that AGREEMENT B indicator is off.

52. Verify that STPIT indicator is off.

53. Verify that REG SEL register display indicates:

0000 111 111 111 111

54. Verify that RG register display indicates:

0000 111 111 111 111

DATE 15 SEP 66

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

NO. 05450 JDC
REV. A
INITIAL TDRR 31093

JOB REGISTER S INHIBIT TEST

ASSEMBLY UNDER TEST

TITLE ____________________
SER. NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________________ SER. NO. ________ ________ CAL DATE
NAME ____________________ SER. NO. ________ ________ CAL DATE

CONDUCTED BY ____________________ NAME/AFFILIATION
APPROVED BY ____________________ NAME/AFFILIATION

Step	Parameter	Specification	Results
3	STPIT indicator out	Testman's Stamp	
6	AGREEMENT indicator out	Testman's Stamp	
10	RZ register display: 0000 011 011 011 011	Testman's Stamp	
11	REG SEL register display: 0000 001 001 001 001	Testman's Stamp	
17	REG SEL register display: 0000 001 001 001 001	Testman's Stamp	
18	RG register display: 0000 011 011 011 011	Testman's Stamp	
19	AGREEMENT indicator on	Testman's Stamp	
20	STPIT indicator on	Testman's Stamp	
25	AGREEMENT indicator off	Testman's Stamp	
26	STPIT indicator off	Testman's Stamp	
27	REG SEL register display: 0000 011 011 011 011	Testman's Stamp	
28	RG register display: 0000 011 011 011 011	Testman's Stamp	

DATE 15 SEP 66

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 05450
REV. A

JOB REGISTER S INHIBIT TEST

Step	Parameter	Specification	Results
32	AGREEMENT indicator off	Testman's Stamp	______
36	RZ register display: 0000 101 101 101 101	Testman's Stamp	______
37	REG SEL register display: 0000 010 010 010 010	Testman's Stamp	______
43	REG SEL register display: 0000 010 010 010 010	Testman's Stamp	______
44	RG register display 0000 111 111 111 111	Testman's Stamp	______
45	AGREEMENT indicator on	Testman's Stamp	______
46	STPIT indicator on	Testman's Stamp	______
51	AGREEMENT indicator off	Testman's Stamp	______
52	STPIT indicator off	Testman's Stamp	______
53	REG SEL register display: 0000 111 111 111 111	Testman's Stamp	______
54	RG register display 0000 111 111 111 111	Testman's Stamp	______

DATE 15 SEP 63

JOB REGISTER S INHIBIT TEST

JDC 05450 **REV.** B **PAGE** 1 **OF** 3
INITIAL TDRR 31093 **D.S. PGS** 2

SUBSYSTEM BM-GSE CTS

ASSY. 2014042-(See JDC 05130)

DESCRIPTION

Checkout Register S Inhibit Logic

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	4-6-67	33507	1	-	EA	-
B	7-12-67	34147	All	-	SB	-

REFERENCES
JDC 05130
ND-1021040, Chapter 5A

IMPORTANT

INTERVAL 180 days

TOOLS AND MATERIAL

PRELIMINARY

1. Ensure that the following switches are set to the positions indicated:

FEEDBACK TC	indicator on
ST1	indicator on
BLK-1	indicator off

2. Set switches and indicators on the self test panel as follows:

FEEDBACK LOAD	indicator on
WS	indicator on
WG4/WG	indicator on
T4	indicator on
T8	indicator off

3. Depress PROCEED pushbutton. STPIT indicator shall be out. Record.

4. Depress KEYBOARD LOAD pushbutton switch (indicator on).

5. Set AGREEMENT A digiswitches to XXXX1111.

6. Set AGREEMENT A SAMPLE switch to STOP. AGREEMENT indicator shall be out. Record.

7. Set register select switch to A.

PROCEDURE

8. Depress CL key.

9. Load RZ with 03333; load RA with 01111.

10. Verify that RZ register display indicates:

0000 011 011 011 011

11. Verify that the REG SEL register display indicates:

0000 001 001 001 001

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 15 SEP 66

JOB REGISTER S INHIBIT TEST **JDC** 05450 **REV** B **PAGE** 2 **OF** 3

SUBSYSTEM BM-GSE CTS **ASSY** 2014042-(See JDC 05130)

12. Set register select switch to S.

13. Depress and hold KEYBOARD LOAD and TRANSFER CONTROL pushbutton switches.

14. Depress EXECUTE.

15. Release TRANSFER CONTROL pushbutton switch.

16. Release KEYBOARD LOAD pushbutton switch (indicator on).

17. Verify that REG SEL register display indicates:

0000 001 001 001 001

18. Verify that RG register display indicates:

0000 011 011 011 011

19. Verify that AGREEMENT A indicator is on.

20. Verify that STPIT indicator is on.

21. Depress and hold KEYBOARD LOAD and TRANSFER CONTROL pushbutton switches.

22. Depress EXECUTE.

23. Release TRANSFER CONTROL pushbutton switch.

24. Release KEYBOARD LOAD pushbutton switch (indicator on).

25. Verify AGREEMENT A indicator is off.

26. Verify that STPIT indicator is off.

27. Verify that REG SEL register display indicates:

0000 011 011 011 011

28. Verify that RG register display indicates:

0000 011 011 011 011

29. Set AGREEMENT A SAMPLE switch to OFF.

30. Set AGREEMENT B digiswitches to XXXX2222.

31. Set AGREEMENT B SAMPLE switch to STOP.

32. Verify that AGREEMENT B indicator is off.

33. Set register select switch to A.

34. Depress CL key.

35. Load RZ with 05555; load RA with 02222.

36. Verify that RZ register display indicates:

0000 101 101 101 101

37. Verify that REG SEL register display indicates:

0000 010 010 010 010

38. Set register select switch to S.

39. Depress and hold KEYBOARD LOAD and TRANSFER CONTROL pushbutton switches.

40. Depress EXECUTE.

41. Release TRANSFER CONTROL pushbutton switch.

42. Release KEYBOARD LOAD pushbutton switch (indicator on).

DATE 15 SEP 66

JOB REGISTER S INHIBIT TEST **JDC** 05450 **REV** B **PAGE** 3 **OF** 3

SUBSYSTEM BM-GSE CTS **ASSY** 2014042-(See JDC 05130)

43. Verify that REG SEL register display indicates:

0000 010 010 010 010

44. Verify that RG register display indicates:

0000 111 111 111 111

45. Verify that AGREEMENT B indicator is on.

46. Verify that STPIT indicator is on.

47. Depress and hold KEYBOARD LOAD and TRANSFER CONTROL pushbutton switches.

48. Depress EXECUTE.

49. Release TRANSFER CONTROL pushbutton switch.

50. Release KEYBOARD LOAD pushbutton switch (indicator on).

51. Verify that AGREEMENT B indicator is off.

52. Verify that STPIT indicator is off.

53. Verify that REG SEL register display indicates:

0000 111 111 111 111

54. Verify that RG register display indicates:

0000 111 111 111 111

DATE 15 SEP 66

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

NO. 05450 JDC
REV. B
INITIAL TDRR 31093

JOB REGISTER S INHIBIT TEST

ASSEMBLY UNDER TEST
TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY
DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
3	STPIT indicator out	Testman's Stamp	____
6	AGREEMENT indicator out	Testman's Stamp	____
10	RZ register display: 0000 011 011 011 011	Testman's Stamp	____
11	REG SEL register display: 0000 001 001 001 001	Testman's Stamp	____
17	REG SEL register display: 0000 001 001 001 001	Testman's Stamp	____
18	RG register display: 0000 011 011 011 011	Testman's Stamp	____
19	AGREEMENT indicator on	Testman's Stamp	____
20	STPIT indicator on	Testman's Stamp	____
25	AGREEMENT indicator off	Testman's Stamp	____
26	STPIT indicator off	Testman's Stamp	____
27	REG SEL register display: 0000 011 011 011 011	Testman's Stamp	____
28	RG register display: 0000 011 011 011 011	Testman's Stamp	____

DATE 15 SEP 66

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 05450
REV. B

JOB REGISTER S INHIBIT TEST

Step	Parameter	Specification	Results
32	AGREEMENT indicator off	Testman's Stamp	________
36	RZ register display: 0000 101 101 101 101	Testman's Stamp	________
37	REG SEL register display: 0000 010 010 010 010	Testman's Stamp	________
43	REG SEL register display: 0000 010 010 010 010	Testman's Stamp	________
44	RG register display 0000 111 111 111 111	Testman's Stamp	________
45	AGREEMENT indicator on	Testman's Stamp	________
46	STPIT indicator on	Testman's Stamp	________
51	AGREEMENT indicator off	Testman's Stamp	________
52	STPIT indicator off	Testman's Stamp	________
53	REG SEL register display: 0000 111 111 111 111	Testman's Stamp	________
54	RG register display 0000 111 111 111 111	Testman's Stamp	________

RAYTHEON C

DATE 15 SEP 63

JOB REGISTER S INHIBIT TEST

JDC 05450 **REV.** - **PAGE** 1 **OF** 3
INITIAL TDRR 31093 **D.S. PGS** 2

SUBSYSTEM BM-GSE CTS

ASSY. 2014042-031, - 041, -051

DESCRIPTION

Checkout Register S Inhibit Logic

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL		REFERENCES
			JDC	D.S.	MIT	NASA	JDC 05130 ND-1021040, Chapter 5A
							IMPORTANT
							INTERVAL 180 days
							TOOLS AND MATERIAL

PRELIMINARY

1. Ensure that the following switches are set to the positions indicated:

FEEDBACK TC	indicator on
ST1	indicator on
BLK-1	indicator on

2. Set switches and indicators on the self test panel as follows:

FEEDBACK LOAD	indicator on
WS	indicator on
WG4/WG	indicator on
T4	indicator on
T8	indicator on

3. Depress PROCEED pushbutton. STPIT indicator shall be out. Record.

4. Depress KEYBOARD LOAD pushbutton switch (indicator on).

5. Set AGREEMENT A digiswitches to XXXX1111.

6. Set AGREEMENT A SAMPLE switch to STOP. AGREEMENT indicator shall be out. Record.

7. Set register select switch to A.

PROCEDURE

8. Depress CL key.

9. Load RZ with 03333; load RA with 01111.

10. Verify that RZ register display indicates:

0000 011 011 011 011

11. Verify that the REG SEL register display indicates:

0000 001 001 001 001

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB REGISTER S INHIBIT TEST

JDC 05450 **REV** - **PAGE** 2 **OF** 3

SUBSYSTEM BM-GSE CTS

ASSY 2014042-031, -041, -051

12. Set register select switch to S.

13. Depress and hold KEYBOARD LOAD and TRANSFER CONTROL pushbutton switches.

14. Depress EXECUTE.

15. Release TRANSFER CONTROL pushbutton switch.

16. Release KEYBOARD LOAD pushbutton switch (indicator on).

17. Verify that REG SEL register display indicates:

0000 001 001 001 001

18. Verify that RG register display indicates:

0000 011 011 011 011

19. Verify that AGREEMENT A indicator is on.

20. Verify that STPIT indicator is on.

21. Depress and hold KEYBOARD LOAD and TRANSFER CONTROL pushbutton switches.

22. Depress EXECUTE.

23. Release TRANSFER CONTROL pushbutton switch.

24. Release KEYBOARD LOAD pushbutton switch (indicator on).

25. Verify AGREEMENT A indicator is off.

26. Verify that STPIT indicator is off.

27. Verify that REG SEL register display indicates:

0000 011 011 011 011

28. Verify that RG register display indicates:

0000 011 011 011 011

29. Set AGREEMENT A SAMPLE switch to OFF.

30. Set AGREEMENT B digiswitches to XXXX2222.

31. Set AGREEMENT B SAMPLE switch to STOP.

32. Verify that AGREEMENT B indicator is off.

33. Set register select switch to A.

34. Depress CL key.

35. Load RZ with 05555; load RA with 02222.

36. Verify that RZ register display indicates:

0000 101 101 101 101

37. Verify that REG SEL register display indicates:

0000 010 010 010 010

38. Set register select switch to S.

39. Depress and hold KEYBOARD LOAD and TRANSFER CONTROL pushbutton switches.

40. Depress EXECUTE.

41. Release TRANSFER CONTROL pushbutton switch.

42. Release KEYBOARD LOAD pushbutton switch (indicator on).

DATE ______

JOB REGISTER S INHIBIT TEST

JDC 05450 **REV** - **PAGE** 3 **OF** 3

SUBSYSTEM BM-GSE CTS

ASSY 2014042 031, - 041, -051

43. Verify that REG SEL register display indicates:

0000 010 010 010 010

44. Verify that RG register display indicates:

0000 111 111 111 111

45. Verify that AGREEMENT B indicator is on.

46. Verify that STPIT indicator is on.

47. Depress and hold KEYBOARD LOAD and TRANSFER CONTROL pushbutton switches.

48. Depress EXECUTE.

49. Release TRANSFER CONTROL pushbutton switch.

50. Release KEYBOARD LOAD pushbutton switch (indicator on).

51. Verify that AGREEMENT B indicator is off.

52. Verify that STPIT indicator is off.

53. Verify that REG SEL register display indicates:

0000 111 111 111 111

54. Verify that RG register display indicates:

0000 111 111 111 111

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

JDC
NO. 05450
REV. -
INITIAL TDRR 31093

JOB REGISTER S INHIBIT TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ **DWG** ______ **REV.** ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ **SER. NO.** ______ CAL DATE
NAME ______ **SER. NO.** ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION **APPROVED BY** ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
3	STPIT indicator out	Testman's Stamp	______
6	AGREEMENT indicator out	Testman's Stamp	______
10	RZ register display: 0000 011 011 011 011	Testman's Stamp	______
11	REG SEL register display: 0000 001 001 001 001	Testman's Stamp	______
17	REG SEL register display: 0000 001 001 001 001	Testman's Stamp	______
18	RG register display: 0000 011 011 011 011	Testman's Stamp	______
19	AGREEMENT indicator on	Testman's Stamp	______
20	STPIT indicator on	Testman's Stamp	______
25	AGREEMENT indicator off	Testman's Stamp	______
26	STPIT indicator off	Testman's Stamp	______
27	REG SEL register display: 0000 011 011 011 011	Testman's Stamp	______
28	RG register display: 0000 011 011 011 011	Testman's Stamp	______

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 05450
REV. -

JOB REGISTER S INHIBIT TEST

Step	Parameter	Specification	Results
32	AGREEMENT indicator off	Testman's Stamp	______
36	RZ register display: 0000 101 101 101 101	Testman's Stamp	______
37	REG SEL register display: 0000 010 010 010 010	Testman's Stamp	______
43	REG SEL register display: 0000 010 010 010 010	Testman's Stamp	______
44	RG register display 0000 111 111 111 111	Testman's Stamp	______
45	AGREEMENT indicator on	Testman's Stamp	______
46	STPIT indicator on	Testman's Stamp	______
51	AGREEMENT indicator off	Testman's Stamp	______
52	STPIT indicator off	Testman's Stamp	______
53	REG SEL register display: 0000 111 111 111 111	Testman's Stamp	______
54	RG register display 0000 111 111 111 111	Testman's Stamp	______

DATE ______

JOB STOP LOGIC CHECKOUT

JDC 05451 **REV.** A **PAGE** 1 **OF** 3

INITIAL TDRR 31093 **D.S. PGS** 3

SUBSYSTEM BM-GSE CTS

ASSY. 2014042-031, -041, -051

DESCRIPTION

Stop logic is checked for proper operation.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	7-12-67	34146	2	-	SB	-

REFERENCES

ND 1021040, Chapter 5A
JDC 05130

IMPORTANT

INTERVAL 180 days

TOOLS AND MATERIAL

1. Depress FRESH START pushbutton on P&M panel. Verify that STPIT indicator is illuminated.

2. Depress PROCEED pushbutton on P&M panel. Verify that the STPIT indicator is out.

3. Set AGREEMENT A selector switch to STOP position. Verify that the AGREEMENT A and STPIT indicators are illuminated.

4. Set AGREEMENT A selector switch to OFF. Press PROCEED. Verify that STPIT indicator goes out.

5. Set AGREEMENT B selector switch to STOP position. Verify that the AGREEMENT B and STPIT indicators are illuminated.

6. Set AGREEMENT B selector switch to OFF. Press PROCEED. Verify that STPIT indicator goes out.

7. Set RG AGREEMENT selector switch to STOP position. Verify that the RG AGREEMENT and STPIT indicators are illuminated.

8. Set RG AGREEMENT selector switch to OFF. Depress PROCEED pushbutton. Verify that the STPIT indicator goes out.

9. Set COUNTER STOP T12 switch to ON. Verify that T12 and STPIT indicators are illuminated.

10. Set COUNTER STOP T12 switch to OFF. Verify that T12 indicator is out.

11. Depress PROCEED pushbutton. Verify that STPIT indicator is out.

12. Set COUNTER STOP NISQ switch to ON. Verify that NISQ and STPIT indicators are illuminated.

13. Set COUNTER STOP NISQ switch to OFF.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 15 SEP 66

JOB STOP LOGIC CHECKOUT

JDC 05451 **REV** A **PAGE** 2 **OF** 3

SUBSYSTEM BM-GSE CTS

ASSY 2014042-031, -041, -051

14. Depress PROCEED pushbutton. Verify that the STPIT and NISQ indicators are out.

15. Set COUNTER STOP RPTR switch to ON. Verify that RPTR and STPIT indicators are illuminated.

16. Set COUNTER STOP RPTR switch to OFF.

17. Depress PROCEED pushbutton. Verify that the RPTR and STPIT indicators are out.

18. Set COUNTER STOP IIP switch to ON. Verify that IIP and STPIT indicator are illuminated.

19. Set COUNTER STOP IIP switch to OFF.

20. Depress PROCEED pushbutton. Verify that the IIP and STPIT indicator are out.

21. Set COUNTER STOP CTROR switch to ON. Verify that CTROR and STPIT indicators are illuminated.

22. Set COUNTER STOP CTROR switch to OFF.

23. Press PROCEED pushbutton. Verify that STPIT and CTROR indicators are out.

24. Set digiswitch on SELF TEST ASSEMBLY box to 06000. Set COUNTER STOP PARITY FAIL switch on logic drawer 2 to ON.

25. Verify that PARITY FAIL and STPIT indicators are illuminated.

26. Set PARITY FAIL switch to OFF.

27. Set Self Test Assembly digiswitch to 00000.

28. Depress ALARM RESET pushbutton on P&M panel. Verify that PARITY FAIL indicator is out.

29. Depress PROCEED pushbutton. Verify that STPIT indicator is out.

30. Set LOAD FEEDBACK switch on self test panel on.

31. Depress KEYBOARD LOAD pushbutton on P&M panel.

32. Set COUNTER STOP INKL switch to ON.

33. Depress EXECUTE pushbutton. Verify that INKL and STPIT indicators are illuminated.

34. Set COUNTER STOP INKL switch to OFF.

35. Depress PROCEED pushbutton. Verify that STPIT and INKL indicators are out.

36. Set switches and indicators on the self test panel as follows:

WS	indicator on
T1	indicator on
T7	indicator on

37. Set REG SEL switch to S position.

38. Press CL pushbutton, press EXECUTE pushbutton.

39. Verify that REG SEL register display indicates:

    0000 000 000 000 000

40. Set REG SEL switch to the A position. Press FREE RUN (indicator on).

DATE 15 SEP 66

JOB STOP LOGIC CHECKOUT

JDC 05451 **REV** A **PAGE** 3 **OF** 3

SUBSYSTEM BM-GSE CTS

ASSY 2014042-031, -041, -051

41. Load RZ with 1111 and RA with 04444.

42. Verify that RZ indicates:

    0000 001 001 001 001

43. Verify that REG SEL indicates:

    0000 100 100 100 100

44. Set the AGREEMENT A digiswitches to XXXX4444.

45. Verify that the AGREEMENT A indicator is off.

46. Set the AGREEMENT A SAMPLE switch to the STOP position.

47. Verify that the STPIT indicator is off.

48. Set the REG SEL switch to the S position.

49. Press FORCED LOAD pushbutton (indicator on).

50. Press EXECUTE.

51. Verify that the AGREEMENT A indicator is dim.

52. Verify that the STPIT indicator is off.

53. Verify that REG SEL indicates (dimly):

    0000 101 101 101 101

54. Press CL pushbutton.

55. Press FORCED LOAD pushbutton (indicator off).

56. Press FREE RUN pushbutton (indicator off). Press T7 pushbutton (indicator off).

57. Load RZ with 4444.

58. Verify that RZ indicates:

    0000 100 100 100 100

59. Press EXECUTE.

60. Verify that the AGREEMENT A indicator is on.

61. Verify that the STPIT indicator is on.

62. Verify that REG SEL indicates:

    0000 100 100 100 100

63. Set AGREEMENT A SAMPLE switch to the OFF position.

64. Press PROCEED.

65. Verify that the STPIT indicator is off.

66. Press T1 pushbutton (indicator off).

67. Press WS pushbutton (indicator off).

68. Set AGREEMENT A digiswitches to XXXXXXXX.

DATE 15 SEP 66

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC
NO. 05451
REV. A
INITIAL TDRR 31093

JOB STOP LOGIC CHECKOUT

ASSEMBLY UNDER TEST	TEST HISTORY
TITLE ________	DATE ____ START ____ END ____ SITE / LOCATION
SER. NO. ____ DWG ____ REV. ____	TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ____ CAL DATE
NAME ________ SER. NO. ____ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

Step	Parameter	Specification	Results
1	STPIT light ON	Testman's Stamp	____
2	STPIT light OFF	Testman's Stamp	____
3	AGREEMENT A and STPIT lights ON	Testman's Stamp	____
4	STPIT light OFF	Testman's Stamp	____
5	AGREEMENT B and STPIT lights ON	Testman's Stamp	____
6	STPIT light OFF	Testman's Stamp	____
7	RG AGREEMENT and STPIT lights ON	Testman's Stamp	____
8	STPIT light OFF	Testman's Stamp	____
9	T12 and STPIT lights ON	Testman's Stamp	____
10	T12 light OFF	Testman's Stamp	____
11	STPIT light OFF	Testman's Stamp	____
12	NISQ and STPIT lights ON	Testman's Stamp	____

DATE 15 SEP 66

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05451
REV. A

JOB STOP LOGIC CHECKOUT

Step	Parameter	Specification	Results
14	NISQ and STPIT lights OFF	Testman's Stamp	
15	RPTR and STPIT lights ON	Testman's Stamp	
17	RPTR and STPIT lights OFF	Testman's Stamp	
18	IIP and STPIT lights ON	Testman's Stamp	
20	IIP and STPIT lights OFF	Testman's Stamp	
21	CTROR and STPIT lights ON	Testman's Stamp	
23	CTROR and STPIT lights OFF	Testman's Stamp	
25	PARITY FAIL and STPIT lights ON	Testman's Stamp	
28	PARITY FAIL lights OFF	Testman's Stamp	
29	STPIT lights OFF	Testman's Stamp	
33	INKL and STPIT lights ON	Testman's Stamp	
35	INKL and STPIT lights OFF	Testman's Stamp	
39	REG SEL indication	0000 000 000 000 000	
42	RZ indication	0000 001 001 001 001	
43	REG SEL indication	0000 100 100 100 100	
45	AGREEMENT A light OFF	Testman's Stamp	
47	STPIT light OFF	Testman's Stamp	
51	AGREEMENT A light (dim)	Testman's Stamp	
52	STPIT light OFF	Testman's Stamp	
53	REG SEL indication (dim)	0000 101 101 101 101	

DATE 15 SEP 66

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05451
REV. A

JOB STOP LOGIC CHECKOUT

Step	Parameter	Specification	Results
58	RZ indication	0000 100 100 100 100	
60	AGREEMENT A light ON	Testman's Stamp	
61	STPIT light ON	Testman's Stamp	
62	REG SEL indication	0000 100 100 100 100	
65	STPIT light OFF	Testman's Stamp	

DATE 15 SEP 66

JOB STOP LOGIC CHECKOUT

JDC 05451 **REV.** B **PAGE** 1 **OF** 3
INITIAL TDRR 31093 **D.S. PGS** 3

SUBSYSTEM BM-GSE CTS
ASSY. 2014042-(See JDC 05130)

DESCRIPTION

Stop logic is checked for proper operation.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	7-12-67	34146	2	-	SB	-
B	7-12-67	34147	All	-	SB	-

REFERENCES
ND 1021040, Chapter 5A
JDC 05130

IMPORTANT

INTERVAL 180 days

TOOLS AND MATERIAL

1. Depress FRESH START pushbutton on P&M panel. Verify that STPIT indicator is illuminated.

2. Depress PROCEED pushbutton on P&M panel. Verify that the STPIT indicator is out.

3. Set AGREEMENT A selector switch to STOP position. Verify that the AGREEMENT A and STPIT indicators are illuminated.

4. Set AGREEMENT A selector switch to OFF. Press PROCEED. Verify that STPIT indicator goes out.

5. Set AGREEMENT B selector switch to STOP position. Verify that the AGREEMENT B and STPIT indicators are illuminated.

6. Set AGREEMENT B selector switch to OFF. Press PROCEED. Verify that STPIT indicator goes out.

7. Set RG AGREEMENT selector switch to STOP position. Verify that the RG AGREEMENT and STPIT indicators are illuminated.

8. Set RG AGREEMENT selector switch to OFF. Depress PROCEED pushbutton. Verify that the STPIT indicator goes out.

9. Set COUNTER STOP T12 switch to ON. Verify that T12 and STPIT indicators are illuminated.

10. Set COUNTER STOP T12 switch to OFF. Verify that T12 indicator is out.

11. Depress PROCEED pushbutton. Verify that STPIT indicator is out.

12. Set COUNTER STOP NISQ switch to ON. Verify that NISQ and STPIT indicators are illuminated.

13. Set COUNTER STOP NISQ switch to OFF.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 15 SEP 66

JOB STOP LOGIC CHECKOUT
JDC 05451 **REV** B **PAGE** 2 **OF** 3

SUBSYSTEM BM-GSE CTS
ASSY 2014042-(See JDC 05130)

14. Depress PROCEED pushbutton. Verify that the STPIT and NISQ indicators are out.

15. Set COUNTER STOP RPTR switch to ON. Verify that RPTR and STPIT indicators are illuminated.

16. Set COUNTER STOP RPTR switch to OFF.

17. Depress PROCEED pushbutton. Verify that the RPTR and STPIT indicators are out.

18. Set COUNTER STOP IIP switch to ON. Verify that IIP and STPIT indicator are illuminated.

19. Set COUNTER STOP IIP switch to OFF.

20. Depress PROCEED pushbutton. Verify that the IIP and STPIT indicator are out.

21. Set COUNTER STOP CTROR switch to ON. Verify that CTROR and STPIT indicators are illuminated.

22. Set COUNTER STOP CTROR switch to OFF.

23. Press PROCEED pushbutton. Verify that STPIT and CTROR indicators are out.

24. Set digiswitch on SELF TEST ASSEMBLY box to 06000. Set COUNTER STOP PARITY FAIL switch on logic drawer 2 to ON.

25. Verify that PARITY FAIL and STPIT indicators are illuminated.

26. Set PARITY FAIL switch to OFF.

27. Set Self Test Assembly digiswitch to 00000.

28. Depress ALARM RESET pushbutton on P&M panel. Verify that PARITY FAIL indicator is out.

29. Depress PROCEED pushbutton. Verify that STPIT indicator is out.

30. Set LOAD FEEDBACK switch on self test panel on.

31. Depress KEYBOARD LOAD pushbutton on P&M panel.

32. Set COUNTER STOP INKL switch to ON.

33. Depress EXECUTE pushbutton. Verify that INKL and STPIT indicators are illuminated.

34. Set COUNTER STOP INKL switch to OFF.

35. Depress PROCEED pushbutton. Verify that STPIT and INKL indicators are out.

36. Set switches and indicators on the self test panel as follows:

WS	indicator on
T1	indicator on
T7	indicator on

37. Set REG SEL switch to S position.

38. Press CL pushbutton, press EXECUTE pushbutton.

39. Verify that REG SEL register display indicates:

0000 000 000 000 000

40. Set REG SEL switch to the A position. Press FREE RUN (indicator on).

DATE 15 SEP 66

JOB STOP LOGIC CHECKOUT
JDC 05451 **REV** B **PAGE** 3 **OF** 3

SUBSYSTEM BM-GSE CTS
ASSY 2014042-(See JDC 05130)

41. Load RZ with 1111 and RA with 04444.

42. Verify that RZ indicates:

0000 001 001 001 001

43. Verify that REG SEL indicates:

0000 100 100 100 100

44. Set the AGREEMENT A digiswitches to XXXX4444.

45. Verify that the AGREEMENT A indicator is off.

46. Set the AGREEMENT A SAMPLE switch to the STOP position.

47. Verify that the STPIT indicator is off.

48. Set the REG SEL switch to the S position.

49. Press FORCED LOAD pushbutton (indicator on).

50. Press EXECUTE.

51. Verify that the AGREEMENT A indicator is dim.

52. Verify that the STPIT indicator is off.

53. Verify that REG SEL indicates (dimly):

0000 101 101 101 101

54. Press CL pushbutton.

55. Press FORCED LOAD pushbutton (indicator off).

56. Press FREE RUN pushbutton (indicator off). Press T7 pushbutton (indicator off).

57. Load RZ with 4444.

58. Verify that RZ indicates:

0000 100 100 100 100

59. Press EXECUTE.

60. Verify that the AGREEMENT A indicator is on.

61. Verify that the STPIT indicator is on.

62. Verify that REG SEL indicates:

0000 100 100 100 100

63. Set AGREEMENT A SAMPLE switch to the OFF position.

64. Press PROCEED.

65. Verify that the STPIT indicator is off.

66. Press T1 pushbutton (indicator off).

67. Press WS pushbutton (indicator off).

68. Set AGREEMENT A digiswitches to XXXXXXXX.

DATE 15 SEP 66

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

NO. 05451 JDC
REV. B
INITIAL TDRR 31093

JOB STOP LOGIC CHECKOUT

ASSEMBLY UNDER TEST
TITLE
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION
APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
1	STPIT light ON	Testman's Stamp	
2	STPIT light OFF	Testman's Stamp	
3	AGREEMENT A and STPIT lights ON	Testman's Stamp	
4	STPIT light OFF	Testman's Stamp	
5	AGREEMENT B and STPIT lights ON	Testman's Stamp	
6	STPIT light OFF	Testman's Stamp	
7	RG AGREEMENT and STPIT lights ON	Testman's Stamp	
8	STPIT light OFF	Testman's Stamp	
9	T12 and STPIT lights ON	Testman's Stamp	
10	T12 light OFF	Testman's Stamp	
11	STPIT light OFF	Testman's Stamp	
12	NISQ and STPIT lights ON	Testman's Stamp	

DATE 15 SEP 66

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05451
REV. B

JOB STOP LOGIC CHECKOUT

Step	Parameter	Specification	Results
14	NISQ and STPIT lights OFF	Testman's Stamp	
15	RPTR and STPIT lights ON	Testman's Stamp	
17	RPTR and STPIT lights OFF	Testman's Stamp	
18	IIP and STPIT lights ON	Testman's Stamp	
20	IIP and STPIT lights OFF	Testman's Stamp	
21	CTROR and STPIT lights ON	Testman's Stamp	
23	CTROR and STPIT lights OFF	Testman's Stamp	
25	PARITY FAIL and STPIT lights ON	Testman's Stamp	
28	PARITY FAIL lights OFF	Testman's Stamp	
29	STPIT lights OFF	Testman's Stamp	
33	INKL and STPIT lights ON	Testman's Stamp	
35	INKL and STPIT lights OFF	Testman's Stamp	
39	REG SEL indication	0000 000 000 000 000	
42	RZ indication	0000 001 001 001 001	
43	REG SEL indication	0000 100 100 100 100	
45	AGREEMENT A light OFF	Testman's Stamp	
47	STPIT light OFF	Testman's Stamp	
51	AGREEMENT A light (dim)	Testman's Stamp	
52	STPIT light OFF	Testman's Stamp	
53	REG SEL indication (dim)	0000 101 101 101 101	

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05451
REV. B

JOB STOP LOGIC CHECKOUT

Step	Parameter	Specification	Results
58	RZ indication	0000 100 100 100 100	
60	AGREEMENT A light ON	Testman's Stamp	
61	STPIT light ON	Testman's Stamp	
62	REG SEL indication	0000 100 100 100 100	
65	STPIT light OFF	Testman's Stamp	

JOB STOP LOGIC CHECKOUT

JDC 05451 REV. C PAGE 1 OF 3
INITIAL TDRR 31093 D.S. PGS 1

SUBSYSTEM BM-GSE CTS

ASSY. 2014042-(See JDC 05130)

DESCRIPTION

Stop logic is checked for proper operation.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA
A	7-12-67	34146	2	-	SB	-
B	7-12-67	34147	All	-	SB	-
C	2-22-68	35712	1	-	EA	-

REFERENCES
ND 1021040, Chapter 5A
JDC 05130

IMPORTANT

INTERVAL 180 days

TOOLS AND MATERIAL

1. Depress FRESH START pushbutton on P&M panel. Verify that STPIT indicator is illuminated.

2. Depress PROCEED pushbutton on P&M panel. Verify that the STPIT indicator is out.

3. Set AGREEMENT A selector switch to STOP position. Verify that the AGREEMENT A and STPIT indicators are illuminated.

4. Set AGREEMENT A selector switch to OFF. Press PROCEED. Verify that STPIT indicator goes out.

5. Set AGREEMENT B selector switch to STOP position. Verify that the AGREEMENT B and STPIT indicators are illuminated.

6. Set AGREEMENT B selector switch to OFF. Press PROCEED. Verify that STPIT indicator goes out.

7. Set RG AGREEMENT selector switch to STOP position. Verify that the RG AGREEMENT and STPIT indicators are illuminated.

8. Set RG AGREEMENT selector switch to OFF. Depress PROCEED pushbutton. Verify that the STPIT indicator goes out.

9. Assure self-test panel BLK-1 pushbutton is ON. Set COUNTER STOP T12 switch to ON. Verify that T12 and STPIT indicators are illuminated.

10. Set COUNTER STOP T12 switch to OFF. Verify that T12 indicator is out.

11. Depress PROCEED pushbutton. Verify that STPIT indicator is out.

12. Set COUNTER STOP NISQ switch to ON. Verify that NISQ and STPIT indicators are illuminated.

13. Set COUNTER STOP NISQ switch to OFF.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 15 SEP 66

JOB STOP LOGIC CHECKOUT

JDC 05451 REV C PAGE 2 OF 3

SUBSYSTEM BM-GSE CTS

ASSY 2014042-(See JDC 05130)

14. Depress PROCEED pushbutton. Verify that the STPIT and NISQ indicators are out.

15. Set COUNTER STOP RPTR switch to ON. Verify that RPTR and STPIT indicators are illuminated.

16. Set COUNTER STOP RPTR switch to OFF.

17. Depress PROCEED pushbutton. Verify that the RPTR and STPIT indicators are out.

18. Set COUNTER STOP IIP switch to ON. Verify that IIP and STPIT indicator are illuminated.

19. Set COUNTER STOP IIP switch to OFF.

20. Depress PROCEED pushbutton. Verify that the IIP and STPIT indicator are out.

21. Set COUNTER STOP CTROR switch to ON. Verify that CTROR and STPIT indicators are illuminated.

22. Set COUNTER STOP CTROR switch to OFF.

23. Press PROCEED pushbutton. Verify that STPIT and CTROR indicators are out.

24. Set digiswitch on SELF TEST ASSEMBLY box to 06000. Set COUNTER STOP PARITY FAIL switch on logic drawer 2 to ON.

25. Verify that PARITY FAIL and STPIT indicators are illuminated.

26. Set PARITY FAIL switch to OFF.

27. Set Self Test Assembly digiswitch to 00000.

28. Depress ALARM RESET pushbutton on P&M panel. Verify that PARITY FAIL indicator is out.

29. Depress PROCEED pushbutton. Verify that STPIT indicator is out.

30. Set LOAD FEEDBACK switch on self test panel on.

31. Depress KEYBOARD LOAD pushbutton on P&M panel.

32. Set COUNTER STOP INKL switch to ON.

33. Depress EXECUTE pushbutton. Verify that INKL and STPIT indicators are illuminated.

34. Set COUNTER STOP INKL switch to OFF.

35. Depress PROCEED pushbutton. Verify that STPIT and INKL indicators are out.

36. Set switches and indicators on the self test panel as follows:

WS	indicator on
T1	indicator on
T7	indicator on

37. Set REG SEL switch to S position.

38. Press CL pushbutton, press EXECUTE pushbutton.

39. Verify that REG SEL register display indicates:

0000 000 000 000 000

40. Set REG SEL switch to the A position. Press FREE RUN (indicator on).

DATE 15 SEP 66

JOB STOP LOGIC CHECKOUT

JDC 05451 REV C PAGE 3 OF 3

SUBSYSTEM BM-GSE CTS

ASSY 2014042-(See JDC 05130)

41. Load RZ with 1111 and RA with 04444.

42. Verify that RZ indicates:

0000 001 001 001 001

43. Verify that REG SEL indicates:

0000 100 100 100 100

44. Set the AGREEMENT A digiswitches to XXXX4444.

45. Verify that the AGREEMENT A indicator is off.

46. Set the AGREEMENT A SAMPLE switch to the STOP position.

47. Verify that the STPIT indicator is off.

48. Set the REG SEL switch to the S position.

49. Press FORCED LOAD pushbutton (indicator on).

50. Press EXECUTE.

51. Verify that the AGREEMENT A indicator is dim.

52. Verify that the STPIT indicator is off.

53. Verify that REG SEL indicates (dimly):

0000 101 101 101 101

54. Press CL pushbutton.

55. Press FORCED LOAD pushbutton (indicator off).

56. Press FREE RUN pushbutton (indicator off). Press T7 pushbutton (indicator off).

57. Load RZ with 4444.

58. Verify that RZ indicates:

0000 100 100 100 100

59. Press EXECUTE.

60. Verify that the AGREEMENT A indicator is on.

61. Verify that the STPIT indicator is on.

62. Verify that REG SEL indicates:

0000 100 100 100 100

63. Set AGREEMENT A SAMPLE switch to the OFF position.

64. Press PROCEED.

65. Verify that the STPIT indicator is off.

66. Press T1 pushbutton (indicator off).

67. Press WS pushbutton (indicator off).

68. Set AGREEMENT A digiswitches to XXXXXXXX.

DATE 15 SEP 66

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

NO. 05451 JDC
REV. C
INITIAL TDRR 31093

JOB STOP LOGIC CHECKOUT

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
1	STPIT light ON	Testman's Stamp	
2	STPIT light OFF	Testman's Stamp	
3	AGREEMENT A and STPIT lights ON	Testman's Stamp	
4	STPIT light OFF	Testman's Stamp	
5	AGREEMENT B and STPIT lights ON	Testman's Stamp	
6	STPIT light OFF	Testman's Stamp	
7	RG AGREEMENT and STPIT lights ON	Testman's Stamp	
8	STPIT light OFF	Testman's Stamp	
9	T12 and STPIT lights ON	Testman's Stamp	
10	T12 light OFF	Testman's Stamp	
11	STPIT light OFF	Testman's Stamp	
12	NISQ and STPIT lights ON	Testman's Stamp	

DATE 15 SEP 66

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05451
REV. C

JOB STOP LOGIC CHECKOUT

Step	Parameter	Specification	Results
14	NBSQ and STPIT lights OFF	Testman's Stamp	
15	RPTR and STPIT lights ON	Testman's Stamp	
17	RPTR and STPIT lights OFF	Testman's Stamp	
18	IIP and STPIT lights ON	Testman's Stamp	
20	IIP and STPIT lights OFF	Testman's Stamp	
21	CTROR and STPIT lights ON	Testman's Stamp	
23	CTROR and STPIT lights OFF	Testman's Stamp	
25	PARITY FAIL and STPIT lights ON	Testman's Stamp	
28	PARITY FAIL lights OFF	Testman's Stamp	
29	STPIT lights OFF	Testman's Stamp	
33	INKL and STPIT lights ON	Testman's Stamp	
35	INKL and STPIT lights OFF	Testman's Stamp	
39	REG SEL indication	0000 000 000 000 000	
42	RZ indication	0000 001 001 001 001	
43	REG SEL indication	0000 100 100 100 100	
45	AGREEMENT A light OFF	Testman's Stamp	
47	STPIT light OFF	Testman's Stamp	
51	AGREEMENT A light (dim)	Testman's Stamp	
52	STPIT light OFF	Testman's Stamp	
53	REG SEL indication (dim)	0000 101 101 101 101	

RAYTHEON C
SPACE AND INFORMATION SYSTEMS DIVISION
DATE 15 SEP 66

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05451
REV. C

JOB STOP LOGIC CHECKOUT

Step	Parameter	Specification	Results
58	RZ indication	0000 100 100 100 100	
60	AGREEMENT A light ON	Testman's Stamp	
61	STPIT light ON	Testman's Stamp	
62	REG SEL indication	0000 100 100 100 100	
65	STPIT light OFF	Testman's Stamp	

RAYTHEON C
SPACE AND INFORMATION SYSTEMS DIVISION
DATE 15 SEP 66

JOB STOP LOGIC CHECKOUT

JDC 05451 **REV.** - **PAGE** 1 **OF** 3

INITIAL TDRR 3/093 **DS PGS** 3

SUBSYSTEM BM-GSE CTS

ASSY. 2014042-031, -041, -051

DESCRIPTION

Stop logic is checked for proper operation.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

ND 1021040, Chapter 5A
JDC 05130

IMPORTANT

INTERVAL 180 days

TOOLS AND MATERIAL

1. Depress FRESH START pushbutton on P&M panel. Verify that STPIT indicator is illuminated.

2. Depress PROCEED pushbutton on P&M panel. Verify that the STPIT indicator is out.

3. Set AGREEMENT A selector switch to STOP position. Verify that the AGREEMENT A and STPIT indicators are illuminated.

4. Set AGREEMENT A selector switch to OFF. Press PROCEED. Verify that STPIT indicator goes out.

5. Set AGREEMENT B selector switch to STOP position. Verify that the AGREEMENT B and STPIT indicators are illuminated.

6. Set AGREEMENT B selector switch to OFF. Press PROCEED. Verify that STPIT indicator goes out.

7. Set RG AGREEMENT selector switch to STOP position. Verify that the RG AGREEMENT and STPIT indicators are illuminated.

8. Set RG AGREEMENT selector switch to OFF. Depress PROCEED pushbutton. Verify that the STPIT indicator goes out.

9. Set COUNTER STOP T12 switch to ON. Verify that T12 and STPIT indicators are illuminated.

10. Set COUNTER STOP T12 switch to OFF. Verify that T12 indicator is out.

11. Depress PROCEED pushbutton. Verify that STPIT indicator is out.

12. Set COUNTER STOP NISQ switch to ON. Verify that NISQ and STPIT indicators are illuminated.

13. Set COUNTER STOP NISQ switch to OFF.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB STOP LOGIC CHECKOUT

JDC 05451 **REV** - **PAGE** 2 **OF** 3

SUBSYSTEM BM-GSE CTS

ASSY 2014042-031, -041, -051

14. Depress PROCEED pushbutton. Verify that the STPIT and NISQ indicators are out.

15. Set COUNTER STOP RPTR switch to ON. Verify that RPTR and STPIT indicators are illuminated.

16. Set COUNTER STOP RPTR switch to OFF.

17. Depress PROCEED pushbutton. Verify that the RPTR and STPIT indicators are out.

18. Set COUNTER STOP IIP switch to ON. Verify that IIP and STPIT indicator are illuminated.

19. Set COUNTER STOP IIP switch to OFF.

20. Depress PROCEED pushbutton. Verify that the IIP and STPIT indicator are out.

21. Set COUNTER STOP CTROR switch to ON. Verify that CTROR and STPIT indicators are illuminated.

22. Set COUNTER STOP CTROR switch to OFF.

23. Press PROCEED pushbutton. Verify that STPIT and CTROR indicators are out.

24. Set SIGNAL SELECT digiswitch on Self Test Assembly to 06000. Set COUNTER STOP PARITY FAIL switch on logic drawer 2 to ON.

25. Verify that PARITY FAIL and STPIT indicators are illuminated.

26. Set PARITY FAIL switch to OFF.

27. Set Self Test Assembly digiswitch to 00000.

28. Depress ALARM RESET pushbutton on P&M panel. Verify that PARITY FAIL indicator is out.

29. Depress PROCEED pushbutton. Verify that STPIT indicator is out.

30. Set LOAD FEEDBACK switch on self test panel on.

31. Depress KEYBOARD LOAD pushbutton on P&M panel.

32. Set COUNTER STOP INKL switch to ON.

33. Depress EXECUTE pushbutton. Verify that INKL and STPIT indicators are illuminated.

34. Set COUNTER STOP INKL switch to OFF.

35. Depress PROCEED pushbutton. Verify that STPIT and INKL indicators are out.

36. Set switches and indicators on the self test panel as follows:

WS	indicator on
T1	indicator on
T7	indicator on

37. Set REG SEL switch to S position.

38. Press CL pushbutton, press EXECUTE pushbutton.

39. Verify that REG SEL register display indicates:

0000 000 000 000 000

40. Set REG SEL switch to the A position. Press FREE RUN (indicator on).

DATE ______

JOB STOP LOGIC CHECKOUT

JDC 05451 **REV** - **PAGE** 3 **OF** 3

SUBSYSTEM BM-GSE CTS

ASSY 2014042-031, -041, -051

41. Load RZ with 1111 and RA with 04444.

42. Verify that RZ indicates:

0000 001 001 001 001

43. Verify that REG SEL indicates:

0000 100 100 100 100

44. Set the AGREEMENT A digiswitches to XXXX4444.

45. Verify that the AGREEMENT A indicator is off.

46. Set the AGREEMENT A SAMPLE switch to the STOP position.

47. Verify that the STPIT indicator is off.

48. Set the REG SEL switch to the S position.

49. Press FORCED LOAD pushbutton (indicator on).

50. Press EXECUTE.

51. Verify that the AGREEMENT A indicator is dim.

52. Verify that the STPIT indicator is off.

53. Verify that REG SEL indicates (dimly):

0000 101 101 101 101

54. Press CL pushbutton.

55. Press FORCED LOAD pushbutton (indicator off).

56. Press FREE RUN pushbutton (indicator off). Press T7 pushbutton (indicator off).

57. Load RZ with 4444.

58. Verify that RZ indicates:

0000 100 100 100 100

59. Press EXECUTE.

60. Verify that the AGREEMENT A indicator is on.

61. Verify that the STPIT indicator is on.

62. Verify that REG SEL indicates:

0000 100 100 100 100

63. Set AGREEMENT A SAMPLE switch to the OFF position.

64. Press PROCEED.

65. Verify that the STPIT indicator is off.

66. Press T1 pushbutton (indicator off).

67. Press WS pushbutton (indicator off).

68. Set AGREEMENT A digiswitches to XXXXXXXX.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

NO. 05451 JDC
REV. -
INITIAL TDRR 3/093

JOB STOP LOGIC CHECKOUT

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
1	STPIT light ON	Testman's Stamp	______
2	STPIT light OFF	Testman's Stamp	______
3	AGREEMENT A and STPIT lights ON	Testman's Stamp	______
4	STPIT light OFF	Testman's Stamp	______
5	AGREEMENT B and STPIT lights ON	Testman's Stamp	______
6	STPIT light OFF	Testman's Stamp	______
7	RG AGREEMENT and STPIT lights ON	Testman's Stamp	______
8	STPIT light OFF	Testman's Stamp	______
9	T12 and STPIT lights ON	Testman's Stamp	______
10	T12 light OFF	Testman's Stamp	______
11	STPIT light OFF	Testman's Stamp	______
12	NISQ and STPIT lights ON	Testman's Stamp	______

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05451
REV. -

JOB STOP LOGIC CHECKOUT

Step	Parameter	Specification	Results
14	NISQ and STPIT lights OFF	Testman's Stamp	
15	RPTR and STPIT lights ON	Testman's Stamp	
17	RPTR and STPIT lights OFF	Testman's Stamp	
18	IIP and STPIT lights ON	Testman's Stamp	
20	IIP and STPIT lights OFF	Testman's Stamp	
21	CTROR and STPIT lights ON	Testman's Stamp	
23	CTROR and STPIT lights OFF	Testman's Stamp	
25	PARITY FAIL and STPIT lights ON	Testman's Stamp	
28	PARITY FAIL lights OFF	Testman's Stamp	
29	STPIT lights OFF	Testman's Stamp	
33	INKL and STPIT lights ON	Testman's Stamp	
35	INKL and STPIT lights OFF	Testman's Stamp	
39	REG SEL indication	0000 000 000 000 000	
42	RZ indication	0000 001 001 001 001	
43	REG SEL indication	0000 100 100 100 100	
45	AGREEMENT A light OFF	Testman's Stamp	
47	STPIT light OFF	Testman's Stamp	
51	AGREEMENT A light (dim)	Testman's Stamp	
52	STPIT light OFF	Testman's Stamp	
53	REG SEL indication (dim)	0000 101 101 101 101	

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05451
REV. -

JOB STOP LOGIC CHECKOUT

Step	Parameter	Specification	Results
58	RZ indication	0000 100 100 100 100	
60	AGREEMENT A light ON	Testman's Stamp	
61	STPIT light ON	Testman's Stamp	
62	REG SEL indication	0000 100 100 100 100	
65	STPIT light OFF	Testman's Stamp	

DATE ________

JOB RECORD COMPARISON MODE CHECKOUT

JDC 05452 **REV.** A **PAGE** 1 **OF** 15
INITIAL TDRR 31093 **D.S. PGS** 11

SUBSYSTEM BM-GSE CTS

ASSY. 2014042-(See JDC 05130)

DESCRIPTION

Checkout of record comparison logic.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	7-12-67	34147	All	-	SB	-

REFERENCES
ND 1021040, Chapter 5A
JDC 05130

IMPORTANT

INTERVAL 180 days

TOOLS AND MATERIAL

1. Depress the following

   ST1 (indicator on)
   T4 (indicator on)
   WS (indicator on)
   (WBB still on)

2. Ensure FEEDBACK LOAD switch is on.

3. Set register select switch to A.

4. Depress KEYBOARD LOAD pushbutton (indicator on).

5. Depress CL key.

6. Load RZ with 00000; load RA with 01234.

7. Verify that RZ register display indicates:

   0000 000 000 000 000

8. Verify that REG SEL register display indicates:

   0000 001 010 011 100

9. Depress EXECUTE.

10. Set register select switch to S.

11. Verify that REG SEL register display indicates:

    0000 001 010 011 100

12. Verify that EBK register display indicates:

    100

13. Depress WS pushbutton (indicator off).

14. Depress WG4/WG pushbutton (indicator on).

15. Set Self Test assembly digiswitch to 4 0 0 0 4.

16. Set INCREMENTS INHIBIT switch to ON. Verify DRIVER TEST lamp is illuminated.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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17. Set RECORD TYPE A and B INSTRUCTION switches to STANDARD.

18. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41234.

19. Set register select switch to A.

20. Depress CL key.

21. Load RZ with 00000; load RA with 76544.

22. Verify that RZ register display indicates:

    0000 000 000 000 000

23. Verify that REG SEL register display indicates:

    0111 110 101 100 100

24. Depress RECORD pushbutton (indicator on).

25. Depress EXECUTE.

26. Verify that RG register display indicates:

    1111 110 101 100 100

27. Verify that EBK register display indicates:

    100

28. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

    1111 110 101 100 100

29. Set register select switch to S.

30. Verify that REG SEL register display indicates:

    0000 001 010 011 100

31. Set register select switch to A.

32. Depress the KEYBOARD LOAD pushbutton (indicator on).

33. Depress CL key.

34. Load RZ with 00000; load RA with 11114.

35. Verify that RZ register display indicates:

    0000 000 000 000 000

36. Verify that REG SEL register display indicates:

    0001 001 001 001 100

37. Depress RECORD pushbutton (indicator on).

38. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41233.

39. Depress EXECUTE.

40. Verify that RG register display indicates:

    1111 110 101 100 100

41. Verify that EBK register display indicates:

    100

42. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

    1111 110 101 100 100

43. Set register select switch to S.

44. Verify that REG SEL register display indicates:

    0000 001 010 011 100

---

45. Set register select switch to A.

46. Set the RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41232.

47. Depress EXECUTE.

48. Verify that RG register display indicates:

    1111 110 101 100 100

49. Verify that EBK register display indicates:

    100

50. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register indicates:

    1111 110 101 100 100

51. Set register select switch to S.

52. Verify that REG SEL register display indicates:

    0000 001 010 011 100

53. Set register select switch to A.

54. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41231.

55. Depress EXECUTE.

56. Verify that RG register display indicates:

    1111 110 101 100 100

57. Verify that EBK register display indicates:

    100

58. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

    1111 110 101 100 100

59. Set register select switch to S.

60. Verify that REG SEL register display indicates:

    0000 001 010 011 100

61. Set register select switch to A.

62. Set the RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41230.

63. Depress EXECUTE.

64. Verify that RG register display indicates:

    1111 110 101 100 100

65. Verify that EBK register display indicates.

    100

66. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

    1111 110 101 100 100

67. Set register select switch to S.

68. Verify that the REG SEL register display indicates:

    0000 001 010 011 100

---

69. Set register select switch to A.

70. Set the RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches for a dial reading of 41237.

71. Depress EXECUTE.

72. Verify that RG register display indicates:

    1111 110 101 100 100

73. Verify that EBK register display indicates:

    100

74. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

    1111 110 101 100 100

75. Set register select switch to S.

76. Verify that REG SEL register display indicates:

    0000 001 010 011 100

77. Set register select switch to A.

78. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41236.

79. Depress EXECUTE.

80. Verify that RG register display indicates:

    1111 110 101 100 100

81. Verify that EBK register display indicates:

    100

82. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

    1111 110 101 100 100

83. Set register select switch to S.

84. Verify that REG SEL register display indicates:

    0000 001 010 011 100

85. Set register select switch to A.

86. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41235.

87. Depress EXECUTE.

88. Verify that RG register display indicates:

    1111 110 101 100 100

89. Verify that EBK register display indicates:

    100

90. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

    1111 110 101 100 100

91. Set register select switch to S.

92. Verify that REG SEL register display indicates:

    0000 001 010 011 100

93. Set register select switch to A.

94. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41224.

95. Depress EXECUTE.

96. Verify that RG register display indicates:

1111 110 101 100 100

97. Verify that EBK register display indicates:

100

98. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

99. Set register select switch to S.

100. Verify that REG SEL register display indicates:

0000 001 010 011 100

101. Set register select switch to A.

102. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches for a dial reading of 41214.

103. Depress EXECUTE.

104. Verify that RG register display indicates:

1111 110 101 100 100

105. Verify that EBK register display indicates:

100

106. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

107. Set register select switch to S.

108. Verify that the REG SEL register display indicates:

0000 001 010 011 100

109. Set register select switch to A.

110. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41204.

111. Depress EXECUTE.

112. Verify that RG register display indicates:

1111 110 101 100 100

113. Verify that EBK register display indicates:

100

114. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

115. Set register select switch to S.

116. Verify that REG SEL register display indicates:

0000 001 010 011 100

117. Set register select switch to A.

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118. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41274.

119. Depress EXECUTE.

120. Verify that the RG register display indicates:

1111 110 101 100 100

121. Verify that EBK register display indicates:

100

122. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

123. Set register select switch to S.

124. Verify that REG SEL register display indicates:

0000 001 010 011 100

125. Set register select switch to A.

126. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41264.

127. Depress EXECUTE.

128. Verify that RG register display indicates:

1111 110 101 100 100

129. Verify that EBK register display indicates:

100

130. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

131. Set register select switch to S.

132. Verify that REG SEL register display indicates:

0000 001 010 011 100

133. Set register select switch to A.

134. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41254.

135. Depress EXECUTE.

136. Verify that RG register display indicates:

1111 110 101 100 100

137. Verify that EBK register display indicates:

100

138. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

139. Set register select switch to S.

140. Verify that REG SEL register display indicates:

0000 001 010 011 100

141. Set register select switch to A.

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142. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41244.

143. Depress EXECUTE.

144. Verify that RG register display indicates:

1111 110 101 100 100

145. Verify that EBK register display indicates:

100

146. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

147. Set register select switch to S.

148. Verify that REG SEL register display indicates:

0000 001 010 011 100

149. Set register select switch to A.

150. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41134.

151. Depress EXECUTE.

152. Verify that RG register display indicates:

1111 110 101 100 100

153. Verify that EBK register display indicates:

100

154. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

1111 110 101 100 100

155. Set register select switch to S.

156. Verify that REG SEL register display indicates:

0000 001 010 011 100

157. Set register select switch to A.

158. Set the RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41034.

159. Depress EXECUTE.

160. Verify that RG register display indicates:

1111 110 101 100 100

161. Verify that EBK register display indicates:

100

162. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

1111 110 101 100 100

163. Set register select switch to S.

164. Verify that REG SEL register display indicates:

0000 001 010 011 100

165. Set register select switch to A.

---

166. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41734.

167. Depress EXECUTE.

168. Verify that RG register display indicates:

1111 110 101 100 100

169. Verify that EBK register display indicates:

100

170. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register indicates:

1111 110 101 100 100

171. Set register select switch to S.

172. Verify that REG SEL register display indicates:

0000 001 010 011 100

173. Set register select switch to A.

174. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41634.

175. Depress EXECUTE.

176. Verify that RG register display indicates:

1111 110 101 100 100

177. Verify that EBK register display indicates:

100

178. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

179. Set register select switch to S.

180. Verify that REG SEL register display indicates:

0000 001 010 011 100

181. Set register select switch to A.

182. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41534.

183. Depress EXECUTE button.

184. Verify that RG register display indicates:

1111 110 101 100 100

185. Verify that EBK register display indicates:

100

186. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

187. Set register select switch to S.

188. Verify that REG SEL register display indicates:

0000 001 010 011 100

189. Set register select switch to position A.

190. Set the RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches for a dial reading of 41434.

191. Depress EXECUTE.

192. Verify that RG register display indicates:

1111 110 101 100 100

193. Verify that EBK register display indicates:

100

194. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

1111 110 101 100 100

195. Set register select switch to S.

196. Verify that REG SEL register display indicates:

0000 001 010 011 100

197. Set register select switch to A.

198. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41334.

199. Depress EXECUTE.

200. Verify that RG register display indicates:

1111 110 101 100 100

201. Verify that EBK register display indicates:

100

202. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

203. Set register select switch to S.

204. Verify that REG SEL register display indicates:

0000 001 010 011 100

205. Set register select switch to A.

206. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches for a dial reading of 40234.

207. Depress EXECUTE.

208. Verify that RG register display indicates:

1111 110 101 100 100

209. Verify that EBK register display indicates:

100

210. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

1111 110 101 100 100

211. Set register select switch to S.

212. Verify that REG SEL register display indicates:

0000 001 010 011 100

213. Set register select switch to A.

---

214. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 46234.

215. Depress EXECUTE.

216. Verify that RG register display indicates:

1111 110 101 100 100

217. Verify that EBK register display indicates:

100

218. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

219. Set register select switch to S.

220. Verify that REG SEL register display indicates:

0000 001 010 011 100

221. Set register select switch to A.

222. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches for a dial reading of 44234.

223. Depress EXECUTE.

224. Verify that RG register display indicates:

1111 110 101 100 100

225. Verify that EBK register display indicates:

100

226. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

227. Set register select switch to S.

228. Verify that REG SEL register display indicates:

0000 001 010 011 100

229. Set register select switch to A.

230. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 42234.

231. Depress EXECUTE.

232. Verify that RG register display indicates:

1111 110 101 100 100

233. Verify that EBK register display indicates:

100

234. Set register select switch to positions B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

235. Set register select switch to S.

236. Verify that REG SEL register display indicates:

0000 001 010 011 100

---

237. Set register select switch to A.

238. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 31234.

239. Depress EXECUTE.

240. Verify that RG register display indicates:

1111 110 101 100 100

241. Verify that EBK register display indicates:

100

242. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

1111 110 101 100 100

243. Set register select switch to S.

244. Verify that REG SEL register display indicates:

0000 001 010 011 100

245. Set register select switch to A.

246. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 21234.

247. Depress EXECUTE.

248. Verify that RG register display indicates:

1111 110 101 100 100

249. Verify that EBK register display indicates:

100

250. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

251. Set register select switch to S.

252. Verify that REG SEL register display indicates:

0000 001 010 011 100

253. Set register select switch to A.

254. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 11234.

255. Depress EXECUTE.

256. Verify that RG register display indicates:

1111 110 101 100 100

257. Verify that EBK register display indicates:

100

258. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

259. Set register select switch to S.

260. Verify that REG SEL register display indicates:

0000 001 010 011 100

---

261. Set register select switch to A.

262. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 01234.

263. Depress EXECUTE.

264. Verify that RG register display indicates:

1111 110 101 100 100

265. Verify that EBK register display indicates:

100

266. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

267. Set register select switch to S.

268. Verify that REG SEL register display indicates:

0000 001 010 011 100

269. Set register select switch to A.

270. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 71234.

271. Depress EXECUTE.

272. Verify that RG register display indicates:

1111 110 101 100 100

273. Verify that EBK register display indicates:

100

274. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

275. Set register select switch to S.

276. Verify that REG SEL register display indicates:

0000 001 010 011 100

277. Set register select switch to A.

278. Set the RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 61234.

279. Depress EXECUTE.

280. Verify that RG register display indicates:

1111 110 101 100 100

281. Verify that EBK register display indicates:

100

282. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

283. Set register select switch to S.

284. Verify that REG SEL register display indicates:

0000 001 010 011 100

285. Set register select switch to A.

286. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 51234.

287. Depress EXECUTE.

288. Verify that RG register display indicates:

1111 110 101 100 100

289. Verify that EBK register display indicates:

100

290. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

291. Set register select switch to S.

292. Verify that REG SEL register display indicates:

0000 001 010 011 100

293. Set register select switch to A.

294. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to X1234.

295. Set RECORD TYPE A and B INSTRUCTION switches to INCREMENT.

296. Set INCREMENTS INHIBIT switch off. Verify DRIVER TEST lamp is off.

297. Depress EXECUTE.

298. Verify that RG register display indicates:

0001 001 001 001 100

299. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

0001 001 001 001 100

300. Set register select switch to S.

301. Verify that REG SEL register display indicates:

0000 001 010 011 100

302. Set register select switch to A.

303. Depress WG4/WG switch (indicator off).

304. Depress RGG switch (indicator on).

305. Depress KEYBOARD LOAD switch (indicator on).

306. Depress CL pushbutton.

307. Load RZ with 00000; load RA with 34344.

308. Verify that RZ register display indicates:

0000 000 000 000 000

309. Verify that REG SEL register display indicates:

0011 100 011 100 100

310. Depress RECORD switch (indicator on).

311. Depress REC TEST switch (indicator on).

312. Depress EXECUTE.

313. Verify that RG register display indicates:

0001 001 001 001 100

---

314. Set the register select switch to positions B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

0001 001 001 001 100

315. Set the register select switch to position S.

316. Verify that REG SEL register display indicates:

0000 001 010 011 100

317. Depress REC TEST switch (indicator off).

318. Depress RGG switch (indicator off).

319. Depress EXECUTE.

320. Verify that RG register display indicates:

0001 001 001 001 100

321. Set the register select switch to positions B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

0001 001 001 001 100

322. Set the register select switch to position S.

323. Verify that the REG SEL register display indicates:

0000 001 010 011 100

324. Depress RGG switch (indicator on).

325. Depress EXECUTE.

326. Verify that the RG register display indicates:

0011 100 011 100 100

327. Set the register select switch to positions B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

0011 100 011 100 100

328. Set the register select switch to position A.

329. Depress KEYBOARD LOAD switch (indicator on).

330. Depress CL pushbutton.

331. Load RZ with 00000; load RA with 01234.

332. Verify that RZ register display indicates:

0000 000 000 000 000

333. Verify that REG SEL register display indicates:

0000 001 010 011 100

334. Depress RECORD switch (indicator on).

335. Depress WS switch (indicator on).

336. Depress EXECUTE.

337. Verify that RG register display indicates:

0011 100 011 100 100

---

338. Set the register select switch to positions B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

0011 100 011 100 100

339. Set the register select switch to position S.

340. Verify that REG SEL register display indicates:

0000 001 010 011 100

341. Depress WS switch (indicator off).

342. Depress RGG switch (indicator off).

343. Set the Self Test assembly digiswitch to 00000.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 11

NO. 05452 JDC
REV. A
INITIAL TDRR 31093

JOB RECORD COMPARISON MODE CHECKOUT

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
7	RZ register display: 0000 000 000 000 000	Testman's Stamp	______
8	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	______
11	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	______
12	EBK register display 100	Testman's Stamp	______
16	DRIVER TEST indicator on	Testman's Stamp	______
22	RZ register display: 0000 000 000 000 000	Testman's Stamp	______
23	REG SEL register display: 0111 110 101 100 100	Testman's Stamp	______
26	RG register display: 1111 110 101 100 100	Testman's Stamp	______
27	EBK register display: 100	Testman's Stamp	______
30	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	______
35	RZ register display: 0000 000 000 000 000	Testman's Stamp	______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 11

JDC
NO. 05452
REV. A

JOB RECORD COMPARISON MODE CHECKOUT

Step	Parameter	Specification	Results
36	REG SEL register display: 0001 001 001 001 100	Testman's Stamp	
40	RG register display: 1111 110 101 100 100	Testman's Stamp	
41	EBK register display: 100	Testman's Stamp	
42	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
44	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
48	RG register display: 1111 110 101 100 100	Testman's Stamp	
49	EBK register display: 100	Testman's Stamp	
50	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
52	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
56	RG register display: 1111 110 101 100 100	Testman's Stamp	
57	EBK register display: 100	Testman's Stamp	
58	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
60	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
64	RG register display: 1111 110 101 100 100	Testman's Stamp	
65	EBK register display: 100	Testman's Stamp	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 11

JDC
NO. 05452
REV. A

JOB RECORD COMPARISON MODE CHECKOUT

Step	Parameter	Specification	Results
66	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
68	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
72	RG register display: 1111 110 101 100 100	Testman's Stamp	
73	EBK register display: 100	Testman's Stamp	
74	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
76	REG SEL register display: 0000 011 010 011 100	Testman's Stamp	
80	RG register display: 1111 110 101 100 100	Testman's Stamp	
81	EBK register display: 100	Testman's Stamp	
82	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
84	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
88	RG register display: 1111 110 101 100 100	Testman's Stamp	
89	EBK register display: 100	Testman's Stamp	
90	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
92	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
96	RG register display: 1111 110 101 100 100	Testman's Stamp	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 11

JDC
NO. 05452
REV. A

JOB RECORD COMPARISON MODE CHECKOUT

Step	Parameter	Specification	Results
97	EBK register display: 100	Testman's Stamp	
98	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
100	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
104	RG register display: 1111 110 101 100 100	Testman's Stamp	
105	EBK register display: 100	Testman's Stamp	
106	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
108	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
112	RG register display: 1111 110 101 100 100	Testman's Stamp	
113	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
114	EBK register display: 1111 110 101 100 100	Testman's Stamp	
116	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
120	RG register display: 1111 110 101 100 100	Testman's Stamp	
121	EBK register display: 100	Testman's Stamp	
122	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
124	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 11

JDC
NO. 05452
REV. A

JOB RECORD COMPARISON MODE CHECKOUT

Step	Parameter	Specification	Results
128	RG register display: 1111 110 101 100 100	Testman's Stamp	
129	EBK register display: 100.	Testman's Stamp	
130	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
132	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
136	RG register display: 1111 110 101 100 100	Testman's Stamp	
137	EBK register display: 100	Testman's Stamp	
138	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
140	REG SEL register display 0000 001 010 011 100	Testman's Stamp	
144	RG register display: 1111 110 101 100 100	Testman's Stamp	
145	EBK register display: 100	Testman's Stamp	
146	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
148	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
152	RG register display: 1111 110 101 100 100	Testman's Stamp	
153	EBK register display: 100	Testman's Stamp	
154	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 11

JOB RECORD COMPARISON MODE CHECKOUT

JDC
NO. 05452
REV. A

Step	Parameter	Specification	Results
156	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
160	RG register display: 1111 110 101 100 100	Testman's Stamp	
161	EBK register display: 100	Testman's Stamp	
162	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
168	RG register display: 1111 110 101 100 100	Testman's Stamp	
169	EBK register display: 100	Testman's Stamp	
170	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
172	REG SEL register display: 0000 001.010 011 100	Testman's Stamp	
176	RG register display: 1111 110 101 100 100	Testman's Stamp	
177	EBK register display: 100	Testman's Stamp	
178	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
180	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
184	RG register display: 1111 110 101 100 100	Testman's Stamp	
185	EBK register display: 100	Testman's Stamp	
186	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 11

JOB RECORD COMPARISON MODE CHECKOUT

JDC
NO. 05452
REV. A

Step	Parameter	Specification	Results
188	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
192	RG register display: 1111 110 101 100 100	Testman's Stamp	
193	EBK register display: 100	Testman's Stamp	
194	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
196	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
200	RG register display: 1111 110 101 100 100	Testman's Stamp	
201	EBK register display: 100	Testman's Stamp	
202	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
204	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
208	RG register display: 1111 110 101 100 100	Testman's Stamp	
209	EBK register display: 100	Testman's Stamp	
210	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
212	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
216	RG register display: 1111 110 101 100 100	Testman's Stamp	
217	EBK register display: 100	Testman's Stamp	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 11

JOB RECORD COMPARISON MODE CHECKOUT

JDC
NO. 05452
REV. A

Step	Parameter	Specification	Results
218	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
220	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
224	RG register display: 1111 110 101 100 100	Testman's Stamp	
225	EBK register display: 100	Testman's Stamp	
226	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
228	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
232	RG register display: 1111 110 101 100 100	Testman's Stamp	
233	EBK register display: 100	Testman's Stamp	
234	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
236	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
240	RG register display: 1111 110 101 100 100	Testman's Stamp	
241	EBK register display: 100	Testman's Stamp	
242	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
244	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
248	RG register display: 1111 110 101 100 100	Testman's Stamp	

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EQUIPMENT TEST
DATA SHEET 9 OF 11

JOB RECORD COMPARISON MODE CHECKOUT

JDC
NO. 05452
REV. A

Step	Parameter	Specification	Results
249	EBK register display: 100	Testman's Stamp	
250	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
252	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
256	RG register display: 1111 110 101 100 100	Testman's Stamp	
257	EBK register display: 100	Testman's Stamp	
258	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
260	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
264	RG register display: 1111 110 101 100 100	Testman's Stamp	
265	EBK register display: 100	Testman's Stamp	
266	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
268	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
272	RG register display: 1111 110 101 100 100	Testman's Stamp	
273	EBK register display: 100	Testman's Stamp	
274	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
276	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	

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EQUIPMENT TEST
DATA SHEET 10 **OF** 11

JDC
NO. 05452
REV. A

JOB RECORD COMPARISON MODE CHECKOUT

Step	Parameter	Specification	Results
280	RG register display: 1111 110 101 100 100	Testman's Stamp	
281	EBK register display: 100	Testman's Stamp	
282	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
284	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
288	RG register display: 1111 110 101 100 100	Testman's Stamp	
289	EBK register display: 100	Testman's Stamp	
290	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
292	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
298	RG register display: 0001 001 001 001 100	Testman's Stamp	
299	REG SEL register display: 0001 001 001 001 100	Testman's Stamp	
301	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	

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EQUIPMENT TEST
DATA SHEET 11 **OF** 11

JDC
NO. 05452
REV. A

JOB RECORD COMPARISON MODE CHECKOUT

Step	Parameter	Specification	Results
308	RZ register display: 0000 000 000 000 000	Testman's Stamp	
309	REG SEL register display 0011 100 011 100 100	Testman's Stamp	
313	RG register display: 0001 001 001 001 100	Testman's Stamp	
314	REG SEL register display: 0001 001 001 001 100	Testman's Stamp	
316	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
320	RG register display: 0001 001 001 001 100	Testman's Stamp	
321	REG SEL register display: 0001 001 001 001 100	Testman's Stamp	
323	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
326	RG register display: 0011 100 011 100 100	Testman's Stamp	
327	REG SEL register display 0011 100 011 100 100	Testman's Stamp	
332	RZ register display 0000 000 000 000 000	Testman's Stamp	
333	REG SEL register display 0000 001 010 011 100	Testman's Stamp	
337	RG register display 0011 100 011 100 100	Testman's Stamp	
338	REG SEL register display: 0011 100 011 100 100	Testman's Stamp	
340	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	

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INITIAL TDRR 3/093 D.S. PGS 11

JOB RECORD COMPARISON MODE CHECKOUT

SUBSYSTEM BM-GSE CTS

ASSY. 2014042-031, -041, -051

DESCRIPTION

Checkout of record comparison logic.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
ND 1021040, Chapter 5A
JDC 05130

IMPORTANT

INTERVAL 180 days

TOOLS AND MATERIAL

1. Depress the following

   ST1 (indicator on)
   T4 (indicator on)
   WS (indicator on)
   (WBB still on)

2. Ensure FEEDBACK LOAD switch is on.

3. Set register select switch to A.

4. Depress KEYBOARD LOAD pushbutton (indicator on).

5. Depress CL key.

6. Load RZ with 00000; load RA with 01234.

7. Verify that RZ register display indicates:

   0000 000 000 000 000

8. Verify that REG SEL register display indicates:

   0000 001 010 011 100

9. Depress EXECUTE.

10. Set register select switch to S.

11. Verify that REG SEL register display indicates:

    0000 001 010 011 100

12. Verify that EBK register display indicates:

    100

13. Depress WS pushbutton (indicator off).

14. Depress WG4/WG pushbutton (indicator on).

15. Set Self Test assembly digiswitch to 4 0 0 0 4.

16. Set INCREMENTS INHIBIT switch to ON. Verify DRIVER TEST lamp is illuminated.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE ______

JOB RECORD COMPARISON MODE CHECKOUT | JDC 05452 REV - PAGE 2 OF 15

SUBSYSTEM BM-GSE CTS | ASSY 2014042-031, -041, -051

17. Set RECORD TYPE A and B INSTRUCTION switches to STANDARD.

18. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41234.

19. Set register select switch to A.

20. Depress CL key.

21. Load RZ with 00000; load RA with 76544.

22. Verify that RZ register display indicates:

    0000 000 000 000 000

23. Verify that REG SEL register display indicates:

    0111 110 101 100 100

24. Depress RECORD pushbutton (indicator on).

25. Depress EXECUTE.

26. Verify that RG register display indicates:

    1111 110 101 100 100

27. Verify that EBK register display indicates:

    100

28. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

    1111 110 101 100 100

29. Set register select switch to S.

30. Verify that REG SEL register display indicates:

    0000 001 010 011 100

31. Set register select switch to A.

32. Depress the KEYBOARD LOAD pushbutton (indicator on).

33. Depress CL key.

34. Load RZ with 00000; load RA with 11114.

35. Verify that RZ register display indicates:

    0000 000 000 000 000

36. Verify that REG SEL register display indicates:

    0001 001 001 001 100

37. Depress RECORD pushbutton (indicator on).

38. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41233.

39. Depress EXECUTE.

40. Verify that RG register display indicates:

    1111 110 101 100 100

41. Verify that EBK register display indicates:

    100

42. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

    1111 110 101 100 100

43. Set register select switch to S.

44. Verify that REG SEL register display indicates:

    0000 001 010 011 100

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JOB RECORD COMPARISON MODE CHECKOUT | JDC 05452 REV - PAGE 3 OF 15

SUBSYSTEM BM-GSE CTS | ASSY 2014042-031, -041, -051

45. Set register select switch to A.

46. Set the RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41232.

47. Depress EXECUTE.

48. Verify that RG register display indicates:

    1111 110 101 100 100

49. Verify that EBK register display indicates:

    100

50. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register indicates:

    1111 110 101 100 100

51. Set register select switch to S.

52. Verify that REG SEL register display indicates:

    0000 001 010 011 100

53. Set register select switch to A.

54. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41231.

55. Depress EXECUTE.

56. Verify that RG register display indicates:

    1111 110 101 100 100

57. Verify that EBK register display indicates:

    100

58. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

    1111 110 101 100 100

59. Set register select switch to S.

60. Verify that REG SEL register display indicates:

    0000 001 010 011 100

61. Set register select switch to A.

62. Set the RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41230.

63. Depress EXECUTE.

64. Verify that RG register display indicates:

    1111 110 101 100 100

65. Verify that EBK register display indicates.

    100

66. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

    1111 110 101 100 100

67. Set register select switch to S.

68. Verify that the REG SEL register display indicates:

    0000 001 010 011 100

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JOB RECORD COMPARISON MODE CHECKOUT | JDC 05452 REV - PAGE 4 OF 15

SUBSYSTEM BM-GSE CTS | ASSY 2014042-031, -041, -051

69. Set register select switch to A.

70. Set the RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches for a dial reading of 41237.

71. Depress EXECUTE.

72. Verify that RG register display indicates:

    1111 110 101 100 100

73. Verify that EBK register display indicates:

    100

74. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

    1111 110 101 100 100

75. Set register select switch to S.

76. Verify that REG SEL register display indicates:

    0000 001 010 011 100

77. Set register select switch to A.

78. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41236.

79. Depress EXECUTE.

80. Verify that RG register display indicates:

    1111 110 101 100 100

81. Verify that EBK register display indicates:

    100

82. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

    1111 110 101 100 100

83. Set register select switch to S.

84. Verify that REG SEL register display indicates:

    0000 001 010 011 100

85. Set register select switch to A.

86. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41235.

87. Depress EXECUTE.

88. Verify that RG register display indicates:

    1111 110 101 100 100

89. Verify that EBK register display indicates:

    100

90. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

    1111 110 101 100 100

91. Set register select switch to S.

92. Verify that REG SEL register display indicates:

    0000 001 010 011 100

93. Set register select switch to A.

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94. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41224.

95. Depress EXECUTE.

96. Verify that RG register display indicates:

1111 110 101 100 100

97. Verify that EBK register display indicates:

100

98. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

99. Set register select switch to S.

100. Verify that REG SEL register display indicates:

0000 001 010 011 100

101. Set register select switch to A.

102. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches for a dial reading of 41214.

103. Depress EXECUTE.

104. Verify that RG register display indicates:

1111 110 101 100 100

105. Verify that EBK register display indicates:

100

106. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

107. Set register select switch to S.

108. Verify that the REG SEL register display indicates:

0000 001 010 011 100

109. Set register select switch to A.

110. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41204.

111. Depress EXECUTE.

112. Verify that RG register display indicates:

1111 110 101 100 100

113. Verify that EBK register display indicates:

100

114. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

115. Set register select switch to S.

116. Verify that REG SEL register display indicates:

0000 001 010 011 100

117. Set register select switch to A.

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118. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41274.

119. Depress EXECUTE.

120. Verify that the RG register display indicates:

1111 110 101 100 100

121. Verify that EBK register display indicates:

100

122. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

123. Set register select switch to S.

124. Verify that REG SEL register display indicates:

0000 001 010 011 100

125. Set register select switch to A.

126. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41264.

127. Depress EXECUTE.

128. Verify that RG register display indicates:

1111 110 101 100 100

129. Verify that EBK register display indicates:

100

130. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

131. Set register select switch to S.

132. Verify that REG SEL register display indicates:

0000 001 010 011 100

133. Set register select switch to A.

134. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41254.

135. Depress EXECUTE.

136. Verify that RG register display indicates:

1111 110 101 100 100

137. Verify that EBK register display indicates:

100

138. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

139. Set register select switch to S.

140. Verify that REG SEL register display indicates:

0000 001 010 011 100

141. Set register select switch to A.

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142. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41244.

143. Depress EXECUTE.

144. Verify that RG register display indicates:

1111 110 101 100 100

145. Verify that EBK register display indicates:

100

146. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

147. Set register select switch to S.

148. Verify that REG SEL register display indicates:

0000 001 010 011 100

149. Set register select switch to A.

150. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41134.

151. Depress EXECUTE.

152. Verify that RG register display indicates:

1111 110 101 100 100

153. Verify that EBK register display indicates:

100

154. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

1111 110 101 100 100

155. Set register select switch to S.

156. Verify that REG SEL register display indicates:

0000 001 010 011 100

157. Set register select switch to A.

158. Set the RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41034.

159. Depress EXECUTE.

160. Verify that RG register display indicates:

1111 110 101 100 100

161. Verify that EBK register display indicates:

100

162. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

1111 110 101 100 100

163. Set register select switch to S.

164. Verify that REG SEL register display indicates:

0000 001 010 011 100

165. Set register select switch to A.

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166. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41734.

167. Depress EXECUTE.

168. Verify that RG register display indicates:

1111 110 101 100 100

169. Verify that EBK register display indicates:

100

170. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register indicates:

1111 110 101 100 100

171. Set register select switch to S.

172. Verify that REG SEL register display indicates:

0000 001 010 011 100

173. Set register select switch to A.

174. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41634.

175. Depress EXECUTE.

176. Verify that RG register display indicates:

1111 110 101 100 100

177. Verify that EBK register display indicates:

100

178. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

179. Set register select switch to S.

180. Verify that REG SEL register display indicates:

0000 001 010 011 100

181. Set register select switch to A.

182. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41534.

183. Depress EXECUTE button.

184. Verify that RG register display indicates:

1111 110 101 100 100

185. Verify that EBK register display indicates:

100

186. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

187. Set register select switch to S.

188. Verify that REG SEL register display indicates:

0000 001 010 011 100

189. Set register select switch to position A.

190. Set the RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches for a dial reading of 41434.

191. Depress EXECUTE.

192. Verify that RG register display indicates:

1111 110 101 100 100

193. Verify that EBK register display indicates:

100

194. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

1111 110 101 100 100

195. Set register select switch to S.

196. Verify that REG SEL register display indicates:

0000 001 010 011 100

197. Set register select switch to A.

198. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 41334.

199. Depress EXECUTE.

200. Verify that RG register display indicates:

1111 110 101 100 100

201. Verify that EBK register display indicates:

100

202. Set the register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

203. Set register select switch to S.

204. Verify that REG SEL register display indicates:

0000 001 010 011 100

205. Set register select switch to A.

206. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches for a dial reading of 40234.

207. Depress EXECUTE.

208. Verify that RG register display indicates:

1111 110 101 100 100

209. Verify that EBK register display indicates:

100

210. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

1111 110 101 100 100

211. Set register select switch to S.

212. Verify that REG SEL register display indicates:

0000 001 010 011 100

213. Set register select switch to A.

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214. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 46234.

215. Depress EXECUTE.

216. Verify that RG register display indicates:

1111 110 101 100 100

217. Verify that EBK register display indicates:

100

218. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

219. Set register select switch to S.

220. Verify that REG SEL register display indicates:

0000 001 010 011 100

221. Set register select switch to A.

222. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches for a dial reading of 44234.

223. Depress EXECUTE.

224. Verify that RG register display indicates:

1111 110 101 100 100

225. Verify that EBK register display indicates:

100

226. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

227. Set register select switch to S.

228. Verify that REG SEL register display indicates:

0000 001 010 011 100

229. Set register select switch to A.

230. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 42234.

231. Depress EXECUTE.

232. Verify that RG register display indicates:

1111 110 101 100 100

233. Verify that EBK register display indicates:

100

234. Set register select switch to positions B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

235. Set register select switch to S.

236. Verify that REG SEL register display indicates:

0000 001 010 011 100

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237. Set register select switch to A.

238. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 31234.

239. Depress EXECUTE.

240. Verify that RG register display indicates:

1111 110 101 100 100

241. Verify that EBK register display indicates:

100

242. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

1111 110 101 100 100

243. Set register select switch to S.

244. Verify that REG SEL register display indicates:

0000 001 010 011 100

245. Set register select switch to A.

246. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 21234.

247. Depress EXECUTE.

248. Verify that RG register display indicates:

1111 110 101 100 100

249. Verify that EBK register display indicates:

100

250. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

251. Set register select switch to S.

252. Verify that REG SEL register display indicates:

0000 001 010 011 100

253. Set register select switch to A.

254. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 11234.

255. Depress EXECUTE.

256. Verify that RG register display indicates:

1111 110 101 100 100

257. Verify that EBK register display indicates:

100

258. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

259. Set register select switch to S.

260. Verify that REG SEL register display indicates:

0000 001 010 011 100

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261. Set register select switch to A.

262. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 01234.

263. Depress EXECUTE.

264. Verify that RG register display indicates:

1111 110 101 100 100

265. Verify that EBK register display indicates:

100

266. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

267. Set register select switch to S.

268. Verify that REG SEL register display indicates:

0000 001 010 011 100

269. Set register select switch to A.

270. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 71234.

271. Depress EXECUTE.

272. Verify that RG register display indicates:

1111 110 101 100 100

273. Verify that EBK register display indicates:

100

274. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

275. Set register select switch to S.

276. Verify that REG SEL register display indicates:

0000 001 010 011 100

277. Set register select switch to A.

278. Set the RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 61234.

279. Depress EXECUTE.

280. Verify that RG register display indicates:

1111 110 101 100 100

281. Verify that EBK register display indicates:

100

282. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

283. Set register select switch to S.

284. Verify that REG SEL register display indicates:

0000 001 010 011 100

285. Set register select switch to A.

286. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to 51234.

287. Depress EXECUTE.

288. Verify that RG register display indicates:

1111 110 101 100 100

289. Verify that EBK register display indicates:

100

290. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

1111 110 101 100 100

291. Set register select switch to S.

292. Verify that REG SEL register display indicates:

0000 001 010 011 100

293. Set register select switch to A.

294. Set RB, RG, RQ, RX, RY, and RLP RECORD COMPARISON digiswitches to X1234.

295. Set RECORD TYPE A and B INSTRUCTION switches to INCREMENT.

296. Set INCREMENTS INHIBIT switch off. Verify DRIVER TEST lamp is off.

297. Depress EXECUTE.

298. Verify that RG register display indicates:

0001 001 001 001 100

299. Set register select switch to B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

0001 001 001 001 100

300. Set register select switch to S.

301. Verify that REG SEL register display indicates:

0000 001 010 011 100

302. Set register select switch to A.

303. Depress WG4/WG switch (indicator off).

304. Depress RGG switch (indicator on).

305. Depress KEYBOARD LOAD switch (indicator on).

306. Depress CL pushbutton.

307. Load RZ with 00000; load RA with 34344.

308. Verify that RZ register display indicates:

0000 000 000 000 000

309. Verify that REG SEL register display indicates:

0011 100 011 100 100

310. Depress RECORD switch (indicator on).

311. Depress REC TEST switch (indicator on).

312. Depress EXECUTE.

313. Verify that RG register display indicates:

0001 001 001 001 100

DATE ________

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314. Set the register select switch to positions B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

0001 001 001 001 100

315. Set the register select switch to position S.

316. Verify that REG SEL register display indicates:

0000 001 010 011 100

317. Depress REC TEST switch (indicator off).

318. Depress RGG switch (indicator off).

319. Depress EXECUTE.

320. Verify that RG register display indicates:

0001 001 001 001 100

321. Set the register select switch to positions B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

0001 001 001 001 100

322. Set the register select switch to position S.

323. Verify that the REG SEL register display indicates:

0000 001 010 011 100

324. Depress RGG switch (indicator on).

325. Depress EXECUTE.

326. Verify that the RG register display indicates:

0011 100 011 100 100

327. Set the register select switch to positions B, Q, X (U), Y, and L. At each switch position verify that the REG SEL register display indicates:

0011 100 011 100 100

328. Set the register select switch to position A.

329. Depress KEYBOARD LOAD switch (indicator on).

330. Depress CL pushbutton.

331. Load RZ with 00000; load RA with 01234.

332. Verify that RZ register display indicates:

0000 000 000 000 000

333. Verify that REG SEL register display indicates:

0000 001 010 011 100

334. Depress RECORD switch (indicator on).

335. Depress WS switch (indicator on).

336. Depress EXECUTE.

337. Verify that RG register display indicates:

0011 100 011 100 100

DATE ________

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338. Set the register select switch to positions B, Q, X (U), Y, and L. At each switch position verify that REG SEL register display indicates:

0011 100 011 100 100

339. Set the register select switch to position S.

340. Verify that REG SEL register display indicates:

0000 001 010 011 100

341. Depress WS switch (indicator off).

342. Depress RGG switch (indicator off).

343. Set the Self Test assembly digiswitch to 00000.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 11

NO. 05452 JDC
REV. -
INITIAL TDRR 31093

JOB RECORD COMPARISON MODE CHECKOUT

ASSEMBLY UNDER TEST

TITLE ________
SER. NO. ________ DWG ________ REV. ________

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ CAL DATE
NAME ________ SER. NO. ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

Step	Parameter	Specification	Results
7	RZ register display: 0000 000 000 000 000	Testman's Stamp	________
8	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	________
11	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	________
12	EBK register display 100	Testman's Stamp	________
16	DRIVER TEST indicator on	Testman's Stamp	________
22	RZ register display: 0000 000 000 000 000	Testman's Stamp	________
23	REG SEL register display: 0111 110 101 100 100	Testman's Stamp	________
26	RG register display: 1111 110 101 100 100	Testman's Stamp	________
27	EBK register display: 100	Testman's Stamp	________
30	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	________
35	RZ register display: 0000 000 000 000 000	Testman's Stamp	________

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 11
JOB RECORD COMPARISON MODE CHECKOUT

JDC
NO. 05452
REV. -

Step	Parameter	Specification	Results
36	REG SEL register display: 0001 001 001 001 100	Testman's Stamp	
40	RG register display: 1111 110 101 100 100	Testman's Stamp	
41	EBK register display: 100	Testman's Stamp	
42	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
44	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
48	RG register display: 1111 110 101 100 100	Testman's Stamp	
49	EBK register display: 100	Testman's Stamp	
50	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
52	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
56	RG register display: 1111 110 101 100 100	Testman's Stamp	
57	EBK register display: 100	Testman's Stamp	
58	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
60	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
64	RG register display: 1111 110 101 100 100	Testman's Stamp	
65	EBK register display: 100	Testman's Stamp	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 11
JOB RECORD COMPARISON MODE CHECKOUT

JDC
NO. 05452
REV. -

Step	Parameter	Specification	Results
66	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
68	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
72	RG register display: 1111 110 101 100 100	Testman's Stamp	
73	EBK register display: 100	Testman's Stamp	
74	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
76	REG SEL register display: 0000 011 010 011 100	Testman's Stamp	
80	RG register display: 1111 110 101 100 100	Testman's Stamp	
81	EBK register display: 100	Testman's Stamp	
82	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
84	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
88	RG register display: 1111 110 101 100 100	Testman's Stamp	
89	EBK register display: 100	Testman's Stamp	
90	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
92	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
96	RG register display: 1111 110 101 100 100	Testman's Stamp	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 11
JOB RECORD COMPARISON MODE CHECKOUT

JDC
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REV. -

Step	Parameter	Specification	Results
97	EBK register display: 100	Testman's Stamp	
98	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
100	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
104	RG register display: 1111 110 101 100 100	Testman's Stamp	
105	EBK register display: 100	Testman's Stamp	
106	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
108	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
112	RG register display: 1111 110 101 100 100	Testman's Stamp	
113	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
114	EBK register display: 1111 110 101 100 100	Testman's Stamp	
116	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
120	RG register display: 1111 110 101 100 100	Testman's Stamp	
121	EBK register display: 100	Testman's Stamp	
122	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
124	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 11
JOB RECORD COMPARISON MODE CHECKOUT

JDC
NO. 05452
REV. -

Step	Parameter	Specification	Results
128	RG register display: 1111 110 101 100 100	Testman's Stamp	
129	EBK register display: 100	Testman's Stamp	
130	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
132	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
136	RG register display: 1111 110 101 100 100	Testman's Stamp	
137	EBK register display: 100	Testman's Stamp	
138	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
140	REG SEL register display 0000 001 010 011 100	Testman's Stamp	
144	RG register display: 1111 110 101 100 100	Testman's Stamp	
145	EBK register display: 100	Testman's Stamp	
146	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
148	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
152	RG register display: 1111 110 101 100 100	Testman's Stamp	
153	EBK register display: 100	Testman's Stamp	
154	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 11

JDC
NO. 05452
REV. -

JOB RECORD COMPARISON MODE CHECKOUT

Step	Parameter	Specification	Results
156	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
160	RG register display: 1111 110 101 100 100	Testman's Stamp	
161	EBK register display: 100	Testman's Stamp	
162	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
168	RG register display: 1111 110 101 100 100	Testman's Stamp	
169	EBK register display: 100	Testman's Stamp	
170	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
172	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
176	RG register display: 1111 110 101 100 100	Testman's Stamp	
177	EBK register display: 100	Testman's Stamp	
178	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
180	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
184	RG register display: 1111 110 101 100 100	Testman's Stamp	
185	EBK register display: 100	Testman's Stamp	
186	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 11

JDC
NO. 05452
REV. -

JOB RECORD COMPARISON MODE CHECKOUT

Step	Parameter	Specification	Results
188	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
192	RG register display: 1111 110 101 100 100	Testman's Stamp	
193	EBK register display: 100	Testman's Stamp	
194	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
196	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
200	RG register display: 1111 110 101 100 100	Testman's Stamp	
201	EBK register display: 100	Testman's Stamp	
202	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
204	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
208	RG register display: 1111 110 101 100 100	Testman's Stamp	
209	EBK register display: 100	Testman's Stamp	
210	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
212	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
216	RG register display: 1111 110 101 100 100	Testman's Stamp	
217	EBK register display: 100	Testman's Stamp	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 11

JDC
NO. 05452
REV. -

JOB RECORD COMPARISON MODE CHECKOUT

Step	Parameter	Specification	Results
218	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
220	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
224	RG register display: 1111 110 101 100 100	Testman's Stamp	
225	EBK register display: 100	Testman's Stamp	
226	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
228	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
232	RG register display: 1111 110 101 100 100	Testman's Stamp	
233	EBK register display: 100	Testman's Stamp	
234	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
236	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
240	RG register display: 1111 110 101 100 100	Testman's Stamp	
241	EBK register display: 100	Testman's Stamp	
242	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
244	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
248	RG register display: 1111 110 101 100 100	Testman's Stamp	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 OF 11

JDC
NO. 05452
REV. -

JOB RECORD COMPARISON MODE CHECKOUT

Step	Parameter	Specification	Results
249	EBK register display: 100	Testman's Stamp	
250	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
252	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
256	RG register display: 1111 110 101 100 100	Testman's Stamp	
257	EBK register display: 100	Testman's Stamp	
258	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
260	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
264	RG register display: 1111 110 101 100 100	Testman's Stamp	
265	EBK register display: 100	Testman's Stamp	
266	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
268	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	
272	RG register display: 1111 110 101 100 100	Testman's Stamp	
273	EBK register display: 100	Testman's Stamp	
274	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	
276	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 OF 11

JDC
NO. 05452
REV. -

JOB RECORD COMPARISON MODE CHECKOUT

Step	Parameter	Specification	Results
280	RG register display: 1111 110 101 100 100	Testman's Stamp	________
281	EBK register display: 100	Testman's Stamp	________
282	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	________
284	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	________
288	RG register display: 1111 110 101 100 100	Testman's Stamp	________
289	EBK register display: 100	Testman's Stamp	________
290	REG SEL register display: 1111 110 101 100 100	Testman's Stamp	________
292	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	________
298	RG register display: 0001 001 001 001 100	Testman's Stamp	________
299	REG SEL register display: 0001 001 001 001 100	Testman's Stamp	________
301	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	________

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 OF 11

JDC
NO. 05452
REV. -

JOB RECORD COMPARISON MODE CHECKOUT

Step	Parameter	Specification	Results
308	RZ register display: 0000 000 000 000 000	Testman's Stamp	________
309	REG SEL register display 0011 100 011 100 100	Testman's Stamp	________
313	RG register display: 0001 001 001 001 100	Testman's Stamp	________
314	REG SEL register display: 0001 001 001 001 100	Testman's Stamp	________
316	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	________
320	RG register display: 0001 001 001 001 100	Testman's Stamp	________
321	REG SEL register display: 0001 001 001 001 100	Testman's Stamp	________
323	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	________
326	RG register display: 0011 100 011 100 100	Testman's Stamp	________
327	REG SEL register display 0011 100 011 100 100	Testman's Stamp	________
332	RZ register display 0000 000 000 000 000	Testman's Stamp	________
333	REG SEL register display 0000 001 010 011 100	Testman's Stamp	________
337	RG register display 0011 100 011 100 100	Testman's Stamp	________
338	REG SEL register display: 0011 100 011 100 100	Testman's Stamp	________
340	REG SEL register display: 0000 001 010 011 100	Testman's Stamp	________

DATE ________

JOB READ MODE TEST

JDC 05453 REV. A PAGE 1 OF 1
INITIAL TDRR 31093 D.S. PGS 1

SUBSYSTEM BM-GSE CTS

ASSY. 2014042-021, -031, -041, -051

DESCRIPTION

Checkout Read Mode Logic

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	4-6-67	33508	1	-	EA	-

REFERENCES
JDC 05130
ND-1021040, Chapter 5A

IMPORTANT

INTERVAL 180 days

TOOLS AND MATERIAL

1. Depress READ AGC pushbutton (indicator on). Depress ST1 (indicator off). Set FEEDBACK TC to Off.

2. Depress CL key.

3. Load RZ with 7777.

4. Depress CHANNEL pushbutton and verify that CHANNEL indicator is on.

5. Depress EXECUTE.

6. Set register select switch to position A.

7. Verify that REG SEL register display indicates:

0000 000 000 111 111

8. Depress CL key.

9. Depress ST1 pushbutton (indicator on).

10. Set FEEDBACK TC to on.

11. Load RZ with 7777.

12. Depress and hold READ AGC and TRANSFER CONTROL pushbuttons.

13. Depress EXECUTE.

14. Release TRANSFER CONTROL pushbutton.

15. Release READ AGC pushbutton (indicator on).

16. Verify that REG SEL register display indicates:

0000 111 111 111 111

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 15 SEP 66

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC NO. 05453
REV. A
INITIAL TDRR 31093

JOB READ MODE TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
7	REG SEL indication	0000 000 000 111 111	______
16	REG SEL indication	0000 111 111 111 111	______

DATE 15 SEP 66

JDC 05453 REV. - PAGE 1 OF 1
INITIAL TDRR 3/093 D.S. PGS 1

JOB READ MODE TEST

SUBSYSTEM BM-GSE CTS
ASSY. 2014042[redacted] -021, -031, -041, -051

DESCRIPTION
Checkout Read Mode Logic

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC 05130
ND-1021040, Chapter 5A

IMPORTANT

INTERVAL 180 days

TOOLS AND MATERIAL

1. Depress READ AGC pushbutton (indicator on).

2. Depress CL key.

3. Load RZ with 7777.

4. Depress CHANNEL pushbutton and verify that CHANNEL indicator is on.

5. Depress EXECUTE.

6. Set register select switch to position A.

7. Verify that REG SEL register display indicates:

0000 000 000 111 111

8. Depress CL key.

9. Depress ST1 pushbutton (indicator on).

10. Set FEEDBACK TC to on.

11. Load RZ with 7777.

12. Depress and hold READ AGC and TRANSFER CONTROL pushbuttons.

13. Depress EXECUTE.

14. Release TRANSFER CONTROL pushbutton.

15. Release READ AGC pushbutton (indicator on).

16. Verify that REG SEL register display indicates:

0000 111 111 111 111

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05453 JDC
REV. -
INITIAL TDRR 3/093

JOB READ MODE TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE ______

NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
7	REG SEL indication	0000 000 000 111 111	
16	REG SEL indication	0000 111 111 111 111	

DATE ______

JOB INSTRUCTION CHECKS MYLAR TAPE

JDC 05772 **REV.** - **PAGE** 1 **OF** 1
INITIAL TDRR 32809 **D.S. PGS** [illegible]

SUBSYSTEM Computer

ASSY. Block II-C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the INSTRUCTION CHECKS Program, JDC 05770.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

JDC 05771
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB INSTRUCTION CHECKS MYLAR TAPE

JDC 05772 **REV.** – **PAGE** 1 **OF** 1

INITIAL TDRR 32809 **D.S. PGS** 0

SUBSYSTEM Computer

ASSY. Block II-C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the INSTRUCTION CHECKS Program, JDC 05770.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

JDC 05771

ND's 1021042, 1021043

IMPORTANT

INTERVAL

As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

JDC 05773 REV. A PAGE 1 OF 20
INITIAL TDRR 32809 D.S. PGS 8

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

Tests the outputs of both the High-order (Channel 3) and Low-order (Channel 4) scalers, along with Time Counters T2 through T6. E Memory retention in the Standby mode is checked during the scaler test. The last section of this test checks the operation of the warning alarm. A brief analysis is included as a preface to each specific test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	4/20/67	33626	1	-	EA	-

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414, 05403
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program TIME AND WARNING CHECKS Mylar Tape, JDC 05774

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the FREQUENCY COUNTER.

3. On the XY Interface Panel:

a. Set the CHANNEL T switches to position 211.

b. Press the LOAD CHAN T 200 OHMS switch to the on (illuminated) position.

c. Set the FREQ + PHASE switch to the FRT T →S position.

4. Prepare the CTS FREQUENCY COUNTER for operation as specified by JDC 05403, and verify that coaxial cables are present and connected as follows:

XY Interface Panel	to	A20 Panel
CNTR-A jack		CNTR A jack
Frequency Counter	to	A20 Panel
FREQ A - DC jack		CNTR A jack

5. On the FREQUENCY COUNTER set:
FUNCTION switch to FREQ A
FREQ-TIME switch to CPS
TRIGGER LEVEL vernier for display of 3200.

6. Set CHANNEL T switches to position 212, and set the FREQUENCY COUNTER FUNCTION switch to the PERIOD A position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 26 JAN 67

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

JDC 05773 REV A PAGE 2 OF 20

SUBSYSTEM Computer

ASSY Block II - C Computer

7. Set the FREQ - TIME switch to the MS scale-center position. Verify that the Display decimal point is located between the first and second least significant digits, i. e., 000000.0. Set the DISPLAY Control to the maximum clockwise position.

8. Load Program TIME AND WARNING CHECKS (JDC 05774) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

9. Rewind tape and verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).

10. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

TTEST4-PROGRAM ANALYSIS Loads E BANKS with CHECKERS. The external (FREQUENCY COUNTER) clock is triggered and Channels 3 and 4 are stored in location 0065 and 0066. The computer then waits for the operator to switch to Standby. After Standby an operator TC to 0373 will resume the program, storing the updated scaler count in locations 67 and 70, stopping the external Counter, and performing a CHECK SUM of E Memory CHECKERS. If the CHECKSUM is correct, program will subtract 0065 from 0067 and 0066 from 0070 and display the total difference in DSKY Register 2 and 3. In order to convert the DSKY count to milliseconds the operator must divide it by 32 out to 7 places. The quotient is then compared with the count displayed on the Frequency counter to verify scaler continuity during standby.

11. Transfer Control to Location 0250 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

12. Press the MONITOR indicator switch to the on (illuminated) position.

13. Press the CL Key.

14. Press the RESET button on the FREQUENCY COUNTER and Verify the display is zeroed.

15. Set the T12 COUNTER STOP switch to the OFF position.

16. Set the INHIBIT INCREMENTS switch to the OFF position.

17. Press the PROCEED button.

18. Let the computer run for approximately 10 seconds. Verify the conditions listed below are present by stamping data sheet.

a. FREQUENCY COUNTER is counting.

b. DSKY Register 1 displays 24-4.

c. DSKY Registers 2 and 3 are blank.

19. Set the T12 COUNTER STOP switch to the ON position.

20. Hold down the DSKY STBY Key until the STBY indicator illuminates and time the interval. (Indicator should illuminate within 2.00 seconds after the STBY Key has been depressed.)

21. Allow the computer to remain in the Standby mode for period longer than 3 minutes but less than 15 minutes. Record the amount of time spent in the Standby mode on the data sheet.

DATE 26 JAN 67

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

JDC 05773 REV A PAGE 3 OF 20

SUBSYSTEM Computer

ASSY Block II - C Computer

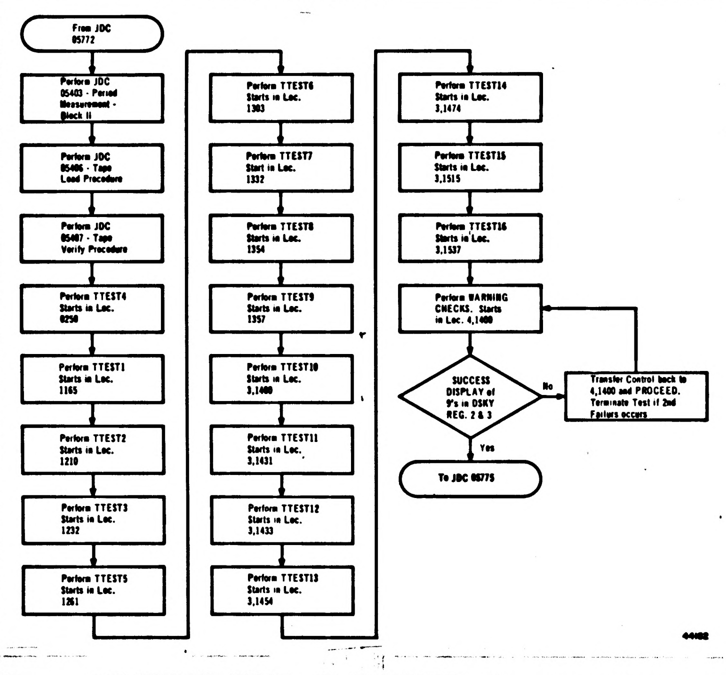
From JDC 05772
Perform JDC 05403 - Period Measurement - Block II
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 - Tape Verify Procedure
Perform TTEST4 Starts in Loc. 0250
Perform TTEST1 Starts in Loc. 1165
Perform TTEST2 Starts in Loc. 1210
Perform TTEST3 Starts in Loc. 1232
Perform TTEST5 Starts in Loc. 1261
Perform TTEST6 Starts in Loc. 1303
Perform TTEST7 Start in Loc. 1332
Perform TTEST8 Starts in Loc. 1354
Perform TTEST9 Starts in Loc. 1357
Perform TTEST10 Starts in Loc. 3,1400
Perform TTEST11 Starts in Loc. 3,1431
Perform TTEST12 Starts in Loc. 3,1433
Perform TTEST13 Starts in Loc. 3,1454
Perform TTEST14 Starts in Loc. 3,1474
Perform TTEST15 Starts in Loc. 3,1515
Perform TTEST16 Starts in Loc. 3,1537
Perform WARNING CHECKS. Starts in Loc. 4,1400
SUCCESS DISPLAY of 9's in DSKY REG. 2 & 3
No
Transfer Control back to 4,1400 and PROCEED. Terminate Test if 2nd Failure occurs
Yes
To JDC 05775
44182

Figure 1. Flowchart for Performing Program TIME AND WARNING CHECKS

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OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

JDC 05773 REV A PAGE 4 OF 20

SUBSYSTEM Computer

ASSY Block II - C Computer

22. Hold down the DSKY STBY Key until the STBY indicator extinguishes. Stamp data sheet.

23. Transfer Control to Location 0373 using the procedures of JDC 05412.

24. Press the MONITOR indicator switch to the on (illuminated) position.

25. Press the CL Key.

26. Set the T12 COUNTER STOP switch to the OFF position.

27. Press the PROCEED button.

28. Verify that the FREQUENCY COUNTER stops counting and immediately record total count.

29. Verify that DSKY Registers 2 and 3 display a number (with a minimum of eight digits total). Record the number on the data sheet. Also divide the DSKY number by 32 and record results on the data sheet.

30. If the DSKY displays all 9's in Registers 2 and 3 the computer has failed the CHECKER BOARD CHECKSUM portion of this test. Proceed to step 7 of this procedure and perform all successive steps again. If the test fails again discontinue further testing.

31. Compare results of steps 28 and 29. Stamp data sheet.

TTEST1 - PROGRAM ANALYSIS

This test segment checks the time required for Channel 4 to count from zero, to full scale. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-1 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER.) The program then re-enters the same Channel 4 full scale check subroutine described above. Immediately after Channel 4 increments through zero again, the program retriggers the external clock, halts the time counter, and sets up the number 5120 in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement with ± 2 counts in the least significant position.

32. Set the T12 COUNTER STOP switch to the ON position.

33. Transfer Control to Location 1165 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

34. Press the MONITOR indicator switch to the on (illuminated) position.

35. Press the CL Key.

36. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

37. Set the T12 COUNTER STOP switch to the OFF position.

38. Press the PROCEED button.

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39. Verify the following events:

a. DSKY Register 1 displays 24-1.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

40. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

41. Verify that the DSKY Register 2 Displays 5120. Stamp data sheet.

42. Verify that the number displayed on the FREQUENCY COUNTER equals the DSKY number 5120 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST2 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 4 to count from zero to 32. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-2 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). The program then reenters the same Channel 4 full scale check subroutine described above, except that an octal 37 is used for a constant in place of the full scale constant. (Octal 37 is equal to decimal 31.) Immediately after Channel 4 reaches the 32nd count, the program retriggers the external clock, halts the time counter, and sets up the number 10 (00010) in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (00010) by the DSKY and verifying agreement within ±2 counts in the least significant position.

43. Set the T12 COUNTER STOP switch to the ON position.

44. Transfer Control to Location 1210 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

45. Press the MONITOR indicator switch to the on (illuminated) position.

46. Press the CL Key.

47. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

48. Set the T12 COUNTER STOP switch to the OFF position.

49. Press the PROCEED button.

50. Verify the following events:

a. DSKY Register 1 displays 24-2.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

51. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

52. Verify that the DSKY Register 2 displays 00010. Stamp data sheet.

53. Verify the number displayed on the FREQUENCY COUNTER equals the DSKY number (00010) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST3 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 3 to increment once. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-3 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). After activating the FREQUENCY COUNTER the program sets up the number 5120 in DSKY display Register 2. The program then stores the contents of Channel 3 into Register L and enters a negative 1 into location 0075 to be indexed later. The program enters a subroutine monitoring the state of Channel 3. This subroutine is similar to the one described above except that the RXOR instruction is transformed to RXOR Channel 3 (instead of 4) by the -1 in the index location. As soon as a difference is detected in the value of Channel 3 (caused by an increment pulse) the program will retrigger the external clock halting the time measurement. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement within ±2 counts in the least significant position.

54. Set the T12 COUNTER STOP switch to the ON position.

55. Transfer Control to Location 1232 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

56. Press the MONITOR indicator switch to the on (illuminated) position.

57. Press the CL Key.

58. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

59. Set the T12 COUNTER STOP switch to the OFF position.

60. Press the PROCEED button.

61. Verify the following events:

a. DSKY Register 1 displays 24-3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

62. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

63. Verify that the DSKY Register 2 displays 5120. Stamp data sheet.

64. Verify that the number displayed on the number (5120) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST5 - PROGRAM ANALYSIS

The program routines comprising Time Test 5 are designed to measure the time required for the TIME 1 Counter to count from 1, through full scale, and back to zero. The TTEST5 programmed test functions and executed in the order listed below.

a. Clears the DSKY Registers and displays the number 1 in position 3 of DSKY Register 1.

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b. Deposits zeros in location 0025 (TIME 1 Counter) and sample loops 0025 for the first count (or a count of 1).

c. Detecting a count of 1, the program will switch to a subroutine to start the external clock (FREQUENCY COUNTER). After starting the external clock the program returns to a sample loop, this time testing for a positive zero condition in 0025.

d. Detecting that 0025 is positive zero, the program switches to a subroutine to stop the external clock. The program then enters a display routine which places the number 16383 in DSKY Register 2, and 00000 in DSKY Register 3. The DSKY displays (Registers 2 and 3) are read as one number, 163,830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

65. Set the T12 COUNTER STOP switch to the ON position.

66. Transfer Control to Location 1261 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

67. Press the MONITOR indicator switch to the on (illuminated) position.

68. Press the CL Key.

69. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

70. Set the T12 COUNTER STOP switch to the OFF position.

71. Press the PROCEED button.

72. Verify the following events:

a. DSKY Register 1 displays a 1 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

73. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

74. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

75. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST6 - PROGRAM ANALYSIS

The program routines comprising Time Test 6 are designed to measure the time required for the TIME2 Counter to count from 1, through full scale, and back to zero. The TTEST6 programmed test functions are executed in the order described below.

a. Clears the DSKY Registers and displays the number 2 in position 3 of DSKY Register 1.

b. Starts the external clock (FREQUENCY COUNTER) immediately after the next transition of the TIME 1 counter.

c. Deposits a count of 1 into the TIME 2 Counter.

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d. Deposits a positive full scale (37777) number into the TIME 1 counter.

e. Enters a sample loop through TIME 1, waiting for the TIME 1 Counter to increment from full scale to zero. This transition indicates that the TIME 2 Counter has been incremented.

f. When the TIME 1 Counter switches to zero, the program will check the TIME 2 Counter for a positive zero condition. If positive zero is not present in the TIME 2 Counter, the program will form a jump loop cycling through the functions described in d and e above, until such time as the TIME 2 Counter is finally incremented back to zero.

g. When a positive zero condition is detected (approximately 163,830 milliseconds later) in the TIME 2 Counter, the program will continue on, first halting the FREQUENCY COUNTER and then entering the DSKY display routine. The DSKY displays (registers 2 and 3) are read as one number, 163,830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

76. Set the T12 COUNTER STOP switch to the ON position.

77. Transfer Control to Location 1303 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

78. Press the MONITOR indicator switch to the on (illuminated) position.

79. Press the CL Key.

80. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

81. Set the T12 COUNTER STOP switch to the OFF position.

82. Press the PROCEED button.

83. Verify the following events:

a. DSKY Register 1 displays a 2 in position 3.

b. The FREQUENCY COUNTER IS counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

84. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

85. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

86. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST7, 8, and 9 - PROGRAM ANALYSIS

TTEST7 measures the time required to increment the TIME 3 Counter from 1, through full scale, and back to zero. TTEST8 measures the time required to increment the TIME 4 Counter from 1, through fully scale, and back to zero. TTEST9 measures the time required to increment the TIME 5 Counter from 1, through full scale, and back to zero. When performing these combined tests the operational sequence starts with Time Test 7 (location 1332), and after the results are displayed the program is continued by a manual Transfer of Control to location 1354 (Time Test 8). After obtaining the results of this test, the program is continued by another manual Transfer of Control to location 1357 for Time Test 9.

All three tests utilize a common routine which clears the DSKY display, starts the external counter after 1 is detected in the TIME Counter being tested, stops the external counter after zero is detected in the TIME Counter under test, and displays the specified elapsed time in DSKY Registers 2 and 3. The common routine is tied into each test by initialization procedures which set the Index location to a value that will produce the proper counter address according to the Time Test being performed. The programmed functions of the common routine are executed in the order described below.

a. Clears the DSKY Registers and displays the test number in position 3 of DSKY Register 1. (Displays 3 for TTEST7, 4 for TTEST8, and 5 for TTEST9.)

b. Deposits positive zero into the TIME Counter under test.

c. Starts the external clock (FREQUENCY COUNTER) immediately after the TIME Counter increments to a count of 1.

d. Enters a sample loop through the TIME Counter location, and looks for a positive zero condition in the TIME Counter.

e. When the TIME Counter reaches positive zero, the program halts the external clock, and enters the DSKY display routine. The DSKY displays (Register 2 and 3) are read as one number 163,830. This number will be displayed at the end of each Time Test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

87. Set the T12 COUNTER STOP switch to the ON position.

88. Transfer Control to Location 1332 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

89. Press the MONITOR indicator switch to the on (illuminated) position.

90. Press the CL Key.

91. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

92. Set the T12 COUNTER STOP switch to the OFF position.

93. Press the PROCEED button.

94. Verify the following events:

a. DSKY Register 1 displays a 3 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

95. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

96. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

97. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

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98. Set the T12 COUNTER STOP switch to the ON position.

99. Transfer Control to Location 1354 using the procesures of JDC 05412 (Transfer Control Operating Procedure).

100. Press the MONITOR indicator switch to the on (illuminated) position.

101. Press the CL Key.

102. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

103. Set the T12 COUNTER STOP switch to the OFF position.

104. Press the PROCEED button.

105. Verify the following events:

a. DSKY Register 1 displays a 4 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

106. Verify the the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

107. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

108. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

109. Set the T12 COUNTER STOP switch to the ON position.

110. Transfer Control to Location 1357 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

111. Press the MONITOR indicator switch to the on (illuminated) position.

112. Press the CL Key.

113. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

114. Set the T12 COUNTER STOP switch to the OFF position.

115. Press the PROCEED button.

116. Verify the following events:

a. DSKY Register 1 displays a 5 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

117. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

118. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

119. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST10 AND 11 - PROGRAM ANALYSIS

TTEST10 measures the time required to decrement the TIME 6 Counter from positive full scale to minus zero. TTEST11 measures the time required to decrement the TIME 6 Counter from full scale to minus zero. The elapsed time measured should result in 10.23906 seconds in both tests. Both tests utilize a common routine to clear the DSKY display, set the TIME 3 Counter set Bit 16 of Channel 13, start the external counter, monitor TIME 6 for a minus zero, and stop the external counter. When performing these tests, the operational sequence starts with Time Test 10 (location 3,1400) and stops when the results are displayed in DSKY Registers 2 and 3. The operator continues the program by Transferring Control to Time Test 11 (location 3,1431). The program also stops on this test when the results are displayed in DSKY Registers 2 and 3. Between the two tests only the initialization procedures are different. During the initialization of Time Test 10, the TIME 6 counter is loaded with a positive full scale number. During the initialization of Time Test 11, the TIME 6 counter is loaded with a negative full scale number. The programmed functions of the routine common to both tests are executed in the order described below.

a. Deposits number (Positive Full Scale for TTEST10 and Negative Full Scale for TTEST11) into the TIME 6 Counter (location 0031).

b. Clears the DSKY Registers and displays the number 6 in position 3 of DSKY Register 1.

c. Sets a Positive Full Scale number into the TIME 3 Counter and CCS loops TIME 3 sampling for an increment back to zero.

d. After TIME 3 increments to zero, the program sets the Enable T6 Rupt (Bit 15, Channel 13) and starts the external counter (FREQUENCY COUNTER).

e. Enters a CCS loop through the TIME Counter location sampling for a minus zero.

f. Stops the external counter immediately after TIME 6 switches to minus zero and displays the number 10239 in DSKY Register 2 and 06000 in DSKY Register 3. This number will be displayed at the end of each test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement with ± 2 counts in the least significant counter position.

120. Set the FREQUENCY COUNTER FREQ-TIME switch to the third MS position. Verify that the decimal point is positioned between the second and third least significant counter digits, i.e., 00000.00.

121. Set the T12 COUNTER STOP switch to the ON position.

122. Transfer Control to Bank 3, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

123. Press the MONITOR indicator switch to the on (illuminated) position.

124. Press the CL Key.

125. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

126. Set the T12 COUNTER STOP switch to the OFF position.

127. Press the PROCEED button.

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128. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

129. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

130. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

131. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 10239.06 milliseconds within ± 2 counts in the least significant counter position. Stamp data sheet.

132. Set the T12 COUNTER STOP switch to the ON position.

133. Transfer Control to Bank 3, location 1431 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

134. Press the MONITOR indicator switch to the on (illuminated) position.

135. Press the CL Key.

136. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

137. Set the T12 COUNTER STOP switch to the OFF position.

138. Press the PROCEED button.

139. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

140. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

141. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

142. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count 10239.06 within ± 2 counts in the least significant counter position. Stamp data sheet.

TTEST12 - PROGRAM ANALYSIS

TTEST12 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 4. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-4 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 4 switches to zero and displays the number 07500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

143. Set the FREQUENCY COUNTER FREQ-TIME switch to the first μs position.

144. Set the T12 COUNTER STOP switch to the ON position.

145. Transfer Control to Bank 3 location 1433 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

146. Press the MONITOR indicator switch to the on (illuminated) position.

147. Press the CL Key.

148. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

149. Set the T12 COUNTER STOP switch to the OFF position.

150. Press the PROCEED button.

151. Verify the following events:

a. DSKY Register 1 displays 3-4 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

152. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

153. Verify that DSKY Register 2 displays 07500 with 00000 in DSKY Register 3. Stamp data sheet.

154. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 7500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST13 - PROGRAM ANALYSIS

TTEST13 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 5. The programmed functions of the test routine are in the order described below.

a. Clears the DSKY display and displays 3-5 in DSKY Register 1 positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 5 Counter and enters a CCS loop through the TIME 5 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 5 switches to zero and displays the number 05000 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

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155. Set the T12 COUNTER STOP switch to the ON position.

156. Transfer Control to Bank 3, location 1454 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

157. Press the MONITOR indicator switch to the on (illuminated) position.

158. Press the CL Key.

159. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

160. Set the T12 COUNTER STOP switch to the OFF position.

161. Press the PROCEED button.

162. Verify the following events:

a. DSKY Register 1 displays 3-5 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

163. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

164. Verify that DSKY Register 2 displays 05000 with 00000 in DSKY Register 3. Stamp data sheet.

165. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 5000 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST14 - PROGRAM ANALYSIS

TTEST14 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 1. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-1 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 1 Counter and enters a CCS loop through the TIME 1 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 1 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

166. Set the T12 COUNTER STOP switch to the ON position.

167. Transfer Control to Bank 3, location 1474 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

168. Press the MONITOR indicator switch to the on (illuminated) position.

169. Press the CL Key.

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170. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

171. Set the T12 COUNTER STOP switch to the OFF position.

172. Press the PROCEED button.

173. Verify the following events:

a. DSKY Register 1 displays 4-1 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

174. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

175. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

176. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST15 - PROGRAM ANALYSIS

TTEST15 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 2. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-2 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 2 Counter and enters a CCS loop through the TIME 2 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 2 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

177. Set the T12 COUNTER STOP switch to the ON position.

178. Transfer Control to Bank 3, location 1515 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

179. Press the MONITOR indicator switch to the on (illuminated) position.

180. Press the CL Key.

181. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

182. Set the T12 COUNTER STOP switch to the OFF position.

183. Press the PROCEED button.

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184. Verify the following events:

a. DSKY Register 1 display 4-2 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

185. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

186. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

187. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST16 - PROGRAM ANALYSIS

TTEST16 measures the time elapse (phase) between the incrementing of TIME 3 and TIME 6. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-6 in DSKY Register 1, positions 2 through 4.

b. Deposits a Negative Full Scale number into the TIME 6 Counter and enables the T6 Rupt (Bit 16 of Channel 13).

c. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

d. After TIME 3 changes to zero, the program starts the external counter (FREQUENCY COUNTER) and inserts a 1 into the TIME 6 Counter.

e. Samples the TIME 6 Counter for a negative zero condition, and after detecting this condition, stops the external counter.

f. Displays the number 03125 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

188. Set the T12 COUNTER STOP switch to the ON position.

189. Transfer Control to Bank 3, location 1537 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

190. Press the MONITOR indicator switch to the on (illuminated) position.

191. Press the CL Key.

192. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

193. Set the T12 COUNTER STOP switch to the OFF position.

194. Press the PROCEED button.

195. Verify the following events:

a. DSKY Register 1 displays 3-6 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

196. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

197. Verify that DSKY Register 2 displays 03125 with 00000 in DSKY Register 3. Stamp data sheet.

198. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 312.5 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

WARNING TEST (WTEST) - PROGRAM ANALYSIS

The purpose of this test is to check the Warning Alarm. Upon entering the test, the state of the Warning Alarm is examined. If the Warning Alarm has been set the program will energize the Computer Activity (COMP ACTY) indicator on the DSKY. A Warning Alarm condition will also illuminate the AGC ALARMS indicator 9 on the LOGIC DRAWER NO. 1 panel of the CTS. The program then provides a 15 second delay during which, the Warning Light should be extinguished (if illuminated). If the Warning Light is still on at the end of this period, the program will enter the STOP Fail routine and the test will be terminated. If the preliminary check was successful, eight additional checks will be performed. Failure of anyone of these checks is indicated in the form of a (15 second) display in DSKY Register 1 without terminating the test. A failure indication is characterized by a 9-displayed in positions 2 and 3 followed by the check number in position 4. (For example if Check #1 fails, Register 1 will display 9-1.) After the failure indication has been displayed for 15 seconds the program will continue on to the next check. The eight checks employ the same philosophy. Each is concerned with pulsing the test alarm bit every "Y" seconds over a period of "Z" seconds. The state of the warning bit is examined at the end of the "Z" seconds and, if it is not what is expected, there is a 15 second fail display.

Each time the Test Alarm bit is pulsed (i.e., every "Y" seconds during a check), the state of the warning bit is checked. The COMP ACTY indicator on the DSKY is then used to indicate the condition of the warning bit. If the warning bit is on the COMP ACTY indicator will be turned on. If the warning bit is off the COMP ACTY indicator will be extinguished.

During the performance of a particular check, the DSKY will display the following:

R1 = 8- "test #(1-8)"

R2 = "Y" - how often the test alarm bit is being pulsed (shown in seconds and hundredths of seconds)

R3 = "Z" - length of time over which the alarm bit is pulsed (in seconds).

At the end of the check, R2 and R3 are blanked and, if success, 8-"test #" remains in R1. Otherwise R1 becomes 9- "test #".

The specifications for each check are shown in table 1.

Table 1. Alarm Test Specifications

Check No.	R1 Display	R2 (Y)*	R3 (Z)	Initial Warning State	End Expected Warning State
1	8-1	3.00	60	OFF	OFF
2	8-2	2.00	60	OFF	OFF or ON accepted
3	8-3	1.00	12	OFF	ON
4	8-4	0.16	1	OFF	ON
5	8-5	0.50	60	ON	ON
6	8-6	1.00	60	ON	ON
7	8-7	2.00	60	ON	OFF or ON accepted
8	8-8	3.00	60	ON	OFF

*(1 pulse every Y.YY secs. for ZZ seconds)

199. Set the T12 COUNTER STOP switch to the ON position.

200. Transfer Control to Bank 4, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

201. Press the MONITOR indicator switch to the on (illuminated) position.

202. Press the CL Key.

203. Set the T12 COUNTER STOP switch to the OFF position.

204. Press the PROCEED button.

205. Verify that the DSKY COMP ACTY indicator is illuminated and DSKY Register 1 displays 8-1.

206. Verify that the DSKY COMP ACTY indicator is extinguished and the DSKY Registers display the following:

Register	Display
1	8-1
2	00300
3	00060

207. Verify that DSKY Registers 2 and 3 are blanked and 8-1 remains in DSKY Register 1. Stamp data sheet.

NOTE: Several checks to follow have extremely short DSKY display times. It is suggested that verification of these checks be initially recorded by a check mark on the JDC sheet itself. The data sheet is then stamped immediately on the conclusion of the WARNING test.

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208. Verify that the DSKY Registers display the following:

Register	Display
1	8-2
2	00200
3	00060

209. Verify that the DSKY COMP ACTY indicator is illuminated but extinguishes in less than a minute.

210. Verify that DSKY Registers 2 and 3 are blanked with 8-2 still in DSKY Register 1. Stamp data sheet.

211. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-3
2	00100
3	00012

212. Verify that DSKY Registers 2 and 3 are blanked, the COMP ACTY indicator is extinguished, and DSKY Register 1 still displays 8-3. Stamp data sheet.

213. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-4
2	00016
3	00001

Stamp data sheet.

214. Verify that the DSKY Registers display the following:

Register	Display
1	8-5
2	00050
3	00060

215. Verify that the DSKY COMP ACTY indicator is illuminated.

216. Verify that the DSKY Registers 2 and 3 are blanked, the DSKY COMP ACTY indicator is still illuminated, and DSKY Register 1 still displays 8-5. Stamp data sheet.

217. Verify that the DSKY Register 1 is blanked and the COMP ACTY indicator is extinguished.

218. Verify that the DSKY Registers display the following:

Register	Display
1	8-6
2	00100
3	00060

219. Verify that the COMP ACTY indicator is illuminated.

220. Verify that DSKY Registers 2 and 3 are blanked with the COMP ACTY indicator still illuminated and 8-6 is still displayed in Register 1. Stamp data sheet.

221. Verify that the COMP ACTY indicator is extinguished and the DSKY Registers now display the following:

Register	Display
1	8-7
2	00200
3	00060

---

222. Verify that the COMP ACTY indicator illuminates.

223. Verify that DSKY Registers 2 and 3 are blanked with the COMP ACTY indicator still illuminated and 8-7 is still displayed in Register 1. Stamp data sheet.

224. Verify that the COMP ACTY indicator extinguishes.

225. Verify that DSKY Register 1 flashes 8-7 once.

226. Verify that the DSKY Registers now display the following:

Register	Display
1	8-8
2	00300
3	00060

227. Verify that the DSKY Registers 2 and 3 are blanked with 8-8 still displayed in Register 1.

228. Verify that DSKY Registers now display the following success indication.

Register	Display
1	8-8
2	99999
3	99999

Stamp data sheet.

229. A failure indication of any one of the eight checks will be displayed in DSKY Register 1 at the end of that particular check. The failure display will be an 8-9 presented in positions 2 through 4 of Register 1. In the event a failure occurs rerun the test by performing steps 199 through 204 again. If the failure reoccurs discontinue further testing.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 8

JDC
NO. 05773
REV. A
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

ASSEMBLY UNDER TEST
TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY
DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION
APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
18.	TTEST4 - Ready for Standby	FREQUENCY COUNTER is counting. DSKY Register 1 is 24-4. DSKY Register 2 and 3 are blank.	
21.	TTEST4 - Amount of time spent in Standby	Computer operated in the Standby mode for a period of	
22.	TTEST4 - Out of Standby	DSKY STBY indicator extinguishes	
28.	TTEST4 - Measurement	FREQUENCY COUNTER totals	
29.	TTEST4 - DSKY Display - Calculations	Registers 2 and 3 displays DSKY NUM/32	
31.	TTEST4 - Evaluation	The data recorded in step 28 agrees with the results of the Calculations of step 29 within ± 0.2 milliseconds.	
39.	TTEST1 - Start Check	DSKY Register 1 is 24-1, FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	

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EQUIPMENT TEST
DATA SHEET 2 OF 8

JDC
NO. 05773
REV. A

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
40.	TTEST1 - Measurement	FREQUENCY COUNTER totals	
41.	TTEST1 - DSKY,Displays	5120	
42.	TTEST1 - Evaluation	Results in steps 40 and 41 are within ±2 counts in the least significant counter position.	
50.	TTEST2 - Start Check	DSKY Register 1 is 24-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
51.	TTEST2 - Measurement	FREQUENCY COUNTER totals	
52.	TTEST2 - DSKY Displays	00010	
53.	TTEST2 - Evaluation	Results in steps 51 and 52 are within ±2 counts in the least significant counter position.	
61.	TTEST3 - Start Check	DSKY Register 1 is 24-3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
62.	TTEST3 - Measurement	FREQUENCY COUNTER totals	
63.	TTEST3 - DSKY Displays	5120	
64.	TTEST3 - Evaluation	Results in steps 62 and 63 are within ±2 counts in the least significant counter position.	

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EQUIPMENT TEST
DATA SHEET 3 OF 8

JDC
NO. 05773
REV. A

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
72.	TTEST5 - Start Check	DSKY Register 1 is 1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
73.	TTEST5 - Measurement	FREQUENCY COUNTER totals	
74.	TTEST5 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
75.	TTEST5 - Evaluation	Results in steps 73 and 74 are within ±2 counts in the least significant counter position.	
83.	TTEST6 - Start Check	DSKY Register 1 is 2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
84.	TTEST6 - Measurement	FREQUENCY COUNTER totals	
85.	TTEST6 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
86.	TTEST6 - Evaluation	Results in steps 84 and 85 are within ± 2 counts in the least significant counter position.	
94.	TTEST7 - Start Check	DSKY Register 1 is 3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
95.	TTEST7 - Measurement	FREQUENCY COUNTER totals	

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EQUIPMENT TEST
DATA SHEET 4 OF 8

JDC
NO. 05773
REV. A

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
96.	TTEST7 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
97.	TTEST7 - Evaluation	Results in steps 95 and 96 are within ±2 counts in the least significant counter position.	
105.	TTEST8 - Start Check	DSKY Register 1 is 4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
106.	TTEST8 - Measurement	FREQUENCY COUNTER totals	
107.	TTEST8 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
108.	TTEST8 - Evaluation	Results in steps 106 and 107 are within ±2 counts in the least significant counter position.	
116.	TTEST9 - Start Check	DSKY Register 1 is 5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
117.	TTEST9 - Measurement	FREQUENCY COUNTER totals	
118.	TTEST9 - DSKY Displays	Reg. 2 = 16383, Reg. 3 - 00000	
119.	TTEST9 - Evaluation	Results in steps 117 and 118 are within ±2 counts in the least significant counter position.	

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EQUIPMENT TEST
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REV. A

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
128.	TTEST10 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
129.	TTEST10 - Measurement	FREQUENCY COUNTER totals	
130.	TTEST10 - DSKY Displays	Reg. 2 = 10239, Reg. 3 - 06000	
131.	TTEST10 - Evaluation	Results in steps 129 and 130 are within ±2 counts in the least significant counter position.	
139.	TTEST11 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
140.	TTEST11 - Measurement	FREQUENCY COUNTER totals	
141.	TTEST11 - DSKY Displays	Reg. 2 = 10239, Reg. 3 = 06000	
142.	TTEST11 - Evaluation	Results in steps 140 and 141 are within ±2 counts in the least significant counter position.	
151.	TTEST12 - Start Check	DSKY Register 1 is 3-4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
152.	TTEST12 - Measurement	FREQUENCY COUNTER totals	

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EQUIPMENT TEST
DATA SHEET 6 OF 8

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REV. A

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
153.	TTEST12 - DSKY Displays	Reg. 2 = 07500, Reg. 3 = 00000	
154.	TTEST12 - Evaluation	Results in steps 152 and 153 are within ±2 counts in the least significant counter position.	
162.	TTEST13 - Start Check	DSKY Register 1 is 3-5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
163.	TTEST13 - Measurement	FREQUENCY COUNTER totals	
164.	TTEST13 - DSKY Displays	Reg. 2 = 05000, Reg. 3 = 00000	
165.	TTEST13 - Evaluation	Results in steps 163 and 164 are within ±2 counts in the least significant counter position.	
173.	TTEST14 - Start Check	DSKY Register 1 is 4-1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
174.	TTEST14 - Measurement	FREQUENCY COUNTER totals	
175.	TTEST14 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
176.	TTEST14 - Evaluation	Results in steps 174 and 175 are within ±2 counts in the least significant counter position.	

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JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
184.	TTEST15 - Start Check	DSKY Register 1 is 4-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
185.	TTEST15 - Measurement	FREQUENCY COUNTER totals	
186.	TTEST15 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
187.	TTEST15 - Evaluation	Results in steps 185 and 186 are within ±2 counts in the least significant counter position.	
195.	TTEST16 - Start Check	DSKY Register 1 is 3-6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
196.	TTEST16 - Measurement	FREQUENCY COUNTER totals	
197.	TTEST16 - DSKY Displays	Reg. 2 = 03125, Reg. 3 = 00000	
198.	TTEST16 - Evaluation	Results in steps 196 and 197 are within ±2 counts in the least significant counter position.	
207.	WTEST Check No. 1	DSKY Register 1 is 8-1. DSKY Registers 2 and 3 are blank.	
210.	WTEST Check No. 2	DSKY Register 1 is 8-2 and Flashes twice. DSKY Registers 2 and 3 are blank.	

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DATA SHEET 8 OF 8

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JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
212.	WTEST Check No. 3	DSKY Register 1 is 8-3. DSKY Registers 2 and 3 are blank.	
213.	WTEST Check No. 4	DSKY Register 1 is 8-4. DSKY Registers 2 and 3 are 00016 and 00001 respectively.	
216.	WTEST Check No. 5	DSKY Register 1 is 8-5. DSKY Registers 2 and 3 are blank.	
220.	WTEST Check No. 6	DSKY Register 1 is 8-6. DSKY Registers 2 and 3 are blank. DSKY COMP ACTY is on.	
223.	WTEST Check No. 7	DSKY Register 1 is 8-7. DSKY Registers 2 and 3 are blank. DSKY COMP ACTY is on.	
228.	WTEST8 and Success Display	DSKY Register 1 is 8-8. DSKY Register 2 is 99999. DSKY Register 3 is 99999.	

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OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

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INITIAL TDRR 32809 D.S. PGS 8

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

Tests the outputs of both the High-order (Channel 3) and Low-order (Channel 4) scalers, along with Time Counters T2 through T6. E Memory retention in the Standby mode is checked during the scaler test. The last section of this test checks the operation of the warning alarm. A brief analysis is included as a preface to each specific test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	4/20/67	33626	1	-	EA	-
B	10-12-67	34824	2,4-16,	8	EA	-
			18,20			

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414, 05403
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program TIME AND WARNING CHECKS Mylar Tape, JDC 05774

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the FREQUENCY COUNTER.

3. On the XY Interface Panel:

a. Set the CHANNEL T switches to position 211.

b. Press the LOAD CHAN T 200 OHMS switch to the on (illuminated) position.

c. Set the FREQ + PHASE switch to the FRT T →S position.

4. Prepare the CTS FREQUENCY COUNTER for operation as specified by JDC 05403, and verify that coaxial cables are present and connected as follows:

XY Interface Panel CNTR-A jack	to	A20 Panel CNTR A jack
Frequency Counter FREQ A - DC jack	to	A20 Panel CNTR A jack

5. On the FREQUENCY COUNTER set:
FUNCTION switch to FREQ A
FREQ-TIME switch to CPS
TRIGGER LEVEL vernier for display of 3200.

6. Set CHANNEL T switches to position 212, and set the FREQUENCY COUNTER FUNCTION switch to the PERIOD A position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

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SUBSYSTEM Computer
ASSY Block II - C Computer

7. Set the FREQ - TIME switch to the MS scale-center position. Verify that the Display decimal point is located between the first and second least significant digits, i. e., 000000.0. Set the DISPLAY Control to the maximum clockwise position.

8. Load Program TIME AND WARNING CHECKS (JDC 05774) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

9. Rewind tape and verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).

10. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

TTEST4-PROGRAM ANALYSIS Loads E BANKS with CHECKERS. The external (FREQUENCY COUNTER) clock is triggered and Channels 3 and 4 are stored in location 0065 and 0066. The computer then waits for the operator to switch to Standby. After Standby an operator TC to 0373 will resume the program, storing the updated scaler count in locations 67 and 70, stopping the external Counter, and performing a CHECK SUM of E Memory CHECKERS. If the CHECKSUM is correct, program will subtract 0065 from 0067 and 0066 from 0070 and display the total difference in DSKY Register 2 and 3. In order to convert the DSKY count to milliseconds the operator must divide it by 32 out to 7 places. The quotient is then compared with the count displayed on the Frequency counter to verify scaler continuity during standby.

11. Transfer Control to Location 0250 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

12. Press the MONITOR indicator switch to the on (illuminated) position.

13. Press the CL Key.

14. Press the RESET button on the FREQUENCY COUNTER and Verify the display is zeroed.

15. Set the T12 COUNTER STOP switch to the OFF position.

16. Set the INHIBIT INCREMENTS switch to the OFF position.

17. Press the PROCEED button.

18. Let the computer run for approximately 10 seconds. Verify the conditions listed below are present by stamping data sheet.

a. FREQUENCY COUNTER is counting.

b. DSKY Register 1 displays 24-4.

c. DSKY Registers 2 and 3 are blank.

19. Hold down the DSKY STBY Key until the STBY indicator illuminates and time the interval. (Indicator should illuminate within 2.00 seconds after the STBY Key has been depressed.)

20. Set the T12 COUNTER STOP switch to the ON position.

21. Allow the computer to remain in the Standby mode for period longer than 3 minutes but less than 15 minutes. Record the amount of time spent in the Standby mode on the data sheet.

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

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SUBSYSTEM Computer
ASSY Block II - C Computer

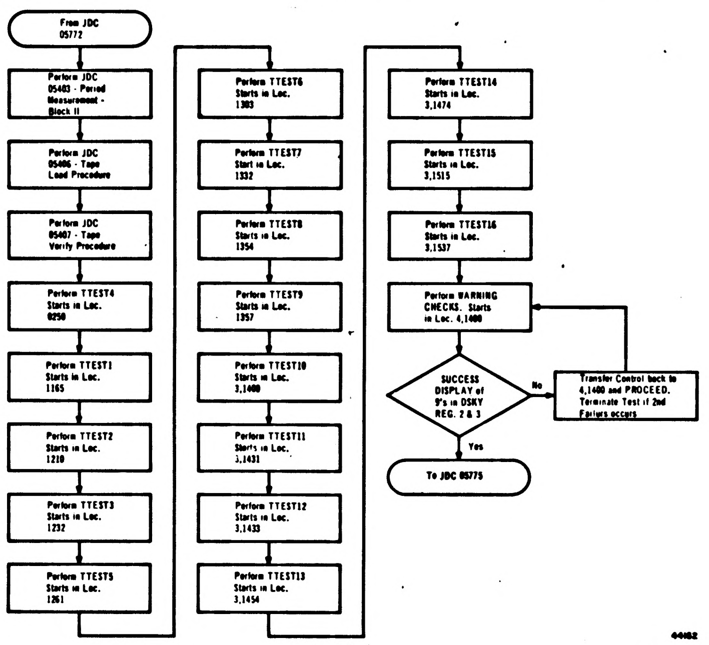
From JDC 05772
Perform JDC 05403 - Period Measurement - Block II
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 - Tape Verify Procedure
Perform TTEST4 Starts in Loc. 0250
Perform TTEST1 Starts in Loc. 1165
Perform TTEST2 Starts in Loc. 1210
Perform TTEST3 Starts in Loc. 1232
Perform TTEST5 Starts in Loc. 1261
Perform TTEST6 Starts in Loc. 1303
Perform TTEST7 Start in Loc. 1332
Perform TTEST8 Starts in Loc. 1354
Perform TTEST9 Starts in Loc. 1357
Perform TTEST10 Starts in Loc. 3,1400
Perform TTEST11 Starts in Loc. 3,1431
Perform TTEST12 Starts in Loc. 3,1433
Perform TTEST13 Starts in Loc. 3,1454
Perform TTEST14 Starts in Loc. 3,1474
Perform TTEST15 Starts in Loc. 3,1515
Perform TTEST16 Starts in Loc. 3,1537
Perform WARNING CHECKS. Starts in Loc. 4,1400
SUCCESS DISPLAY of 9's in DSKY REG. 2 & 3
No
Transfer Control back to 4,1400 and PROCEED. Terminate Test if 2nd Failure occurs
Yes
To JDC 05775
44182

Figure 1. Flowchart for Performing Program TIME AND WARNING CHECKS

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

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SUBSYSTEM Computer
ASSY Block II - C Computer

22. Hold down the DSKY STBY Key until the STBY indicator extinguishes. Stamp data sheet.

23. Transfer Control to Location 0373 using the procedures of JDC 05412.

24. Press the MONITOR indicator switch to the on (illuminated) position.

25. Press the CL Key.

26. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

27. Press the PROCEED button.

28. Verify that the FREQUENCY COUNTER stops counting and immediately record total count.

29. Verify that DSKY Registers 2 and 3 display a number (with a minimum of eight digits total). Record the number on the data sheet. Also divide the DSKY number by 32 and record results on the data sheet.

30. If the DSKY displays all 9's in Registers 2 and 3 the computer has failed the CHECKER BOARD CHECKSUM portion of this test. Proceed to step 7 of this procedure and perform all successive steps again. If the test fails again discontinue further testing.

31. Compare results of steps 28 and 29. Stamp data sheet.

TTEST1 - PROGRAM ANALYSIS

This test segment checks the time required for Channel 4 to count from zero, to full scale. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-1 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER.) The program then re-enters the same Channel 4 full scale check subroutine described above. Immediately after Channel 4 increments through zero again, the program retriggers the external clock, halts the time counter, and sets up the number 5120 in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement with ± 2 counts in the least significant position.

32. Set the T12 COUNTER STOP switch to the ON position.

33. Transfer Control to Location 1165 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

34. Press the MONITOR indicator switch to the on (illuminated) position.

35. Press the CL Key.

36. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

37. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

38. Press the PROCEED button.

39. Verify the following events:

a. DSKY Register 1 displays 24-1.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

40. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

41. Verify that the DSKY Register 2 Displays 5120. Stamp data sheet.

42. Verify that the number displayed on the FREQUENCY COUNTER equals the DSKY number 5120 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST2 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 4 to count from zero to 32. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-2 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). The program then reenters the same Channel 4 full scale check subroutine described above, except that an octal 37 is used for a constant in place of the full scale constant. (Octal 37 is equal to decimal 31.) Immediately after Channel 4 reaches the 32nd count, the program retriggers the external clock, halts the time counter, and sets up the number 10 (00010) in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (00010) by the DSKY and verifying agreement within ±2 counts in the least significant position.

43. Set the T12 COUNTER STOP switch to the ON position.

44. Transfer Control to Location 1210 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

45. Press the MONITOR indicator switch to the on (illuminated) position.

46. Press the CL Key.

47. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

48. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

49. Press the PROCEED button.

50. Verify the following events:

a. DSKY Register 1 displays 24-2.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank

51. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

52. Verify that the DSKY Register 2 displays 00010. Stamp data sheet.

53. Verify the number displayed on the FREQUENCY COUNTER equals the DSKY number (00010) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST3 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 3 to increment once. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-3 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). After activating the FREQUENCY COUNTER the program sets up the number 5120 in DSKY display Register 2. The program then stores the contents of Channel 3 into Register L and enters a negative 1 into location 0075 to be Indexed later. The program enters a subroutine monitoring the state of Channel 3. This subroutine is similar to the one described above except that the RXOR instruction is transformed to RXOR Channel 3 (instead of 4) by the -1 in the Index location. As soon as a difference is detected in the value of Channel 3 (caused by an increment pulse) the program will retrigger the external clock halting the time measurement. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement within ±2 counts in the least significant position.

54. Set the T12 COUNTER STOP switch to the ON position.

55. Transfer Control to Location 1232 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

56. Press the MONITOR indicator switch to the on (illuminated) position.

57. Press the CL Key.

58. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

59. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

60. Press the PROCEED button.

61. Verify the following events:

a. DSKY Register 1 displays 24-3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

62. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

63. Verify that the DSKY Register 2 displays 5120. Stamp data sheet.

64. Verify that the number displayed on the number (5120) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST5 - PROGRAM ANALYSIS

The program routines comprising Time Test 5 are designed to measure the time required for the TIME 1 Counter to count from 1, through full scale, and back to zero. The TTEST5 programmed test functions and executed in the order listed below.

a. Clears the DSKY Registers and displays the number 1 in position 3 of DSKY Register 1.

b. Deposits zeros in location 0025 (TIME 1 Counter) and sample loops 0025 for the first count (or a count of 1).

c. Detecting a count of 1, the program will switch to a subroutine to start the external clock (FREQUENCY COUNTER). After starting the external clock the program returns to a sample loop, this time testing for a positive zero condition in 0025.

d. Detecting that 0025 is positive zero, the program switches to a subroutine to stop the external clock. The program then enters a display routine which places the number 16383 in DSKY Register 2, and 00000 in DSKY Register 3. The DSKY displays (Registers 2 and 3) are read as one number, 163, 830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

65. Set the T12 COUNTER STOP switch to the ON position.

66. Transfer Control to Location 1261 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

67. Press the MONITOR indicator switch to the on (illuminated) position.

68. Press the CL Key.

69. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

70. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

71. Press the PROCEED button.

72. Verify the following events:

a. DSKY Register 1 displays a 1 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

73. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

74. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

75. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST6 - PROGRAM ANALYSIS

The program routines comprising Time Test 6 are designed to measure the time required for the TIME2 Counter to count from 1, through full scale, and back to zero. The TTEST6 programmed test functions are executed in the order described below.

a. Clears the DSKY Registers and displays the number 2 in position 3 of DSKY Register 1.

b. Starts the external clock (FREQUENCY COUNTER) immediately after the next transition of the TIME 1 counter.

c. Deposits a count of 1 into the TIME 2 Counter.

d. Deposits a positive full scale (37777) number into the TIME 1 counter.

e. Enters a sample loop through TIME 1, waiting for the TIME 1 Counter to increment from full scale to zero. This transition indicates that the TIME 2 Counter has been incremented.

f. When the TIME 1 Counter switches to zero, the program will check the TIME 2 Counter for a positive zero condition. If positive zero is not present in the TIME 2 Counter, the program will form a jump loop cycling through the functions described in d and e above, until such time as the TIME 2 Counter is finally incremented back to zero.

g. When a positive zero condition is detected (approximately 163, 830 milliseconds later) in the TIME 2 Counter, the program will continue on, first halting the FREQUENCY COUNTER and then entering the DSKY display routine. The DSKY displays (registers 2 and 3) are read as one number, 163, 830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

76. Set the T12 COUNTER STOP switch to the ON position.

77. Transfer Control to Location 1303 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

78. Press the MONITOR indicator switch to the on (illuminated) position.

79. Press the CL Key.

80. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

81. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

82. Press the PROCEED button.

83. Verify the following events:

a. DSKY Register 1 displays a 2 in position 3.

b. The FREQUENCY COUNTER IS counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

84. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

85. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

86. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST7, 8, and 9 - PROGRAM ANALYSIS

TTEST7 measures the time required to increment the TIME 3 Counter from 1, through full scale, and back to zero. TTEST8 measures the time required to increment the TIME 4 Counter from 1, through fully scale, and back to zero. TTEST9 measures the time required to increment the TIME 5 Counter from 1, through full scale, and back to zero. When performing these combined tests the operational sequence starts with Time Test 7 (location 1332), and after the results are displayed the program is continued by a manual Transfer of Control to location 1354 (Time Test 8). After obtaining the results of this test, the program is continued by another manual Transfer of Control to location 1357 for Time Test 9.

All three tests utilize a common routine which clears the DSKY display, starts the external counter after 1 is detected in the TIME Counter being tested, stops the external counter after zero is detected in the TIME Counter under test, and displays the specified elapsed time in DSKY Registers 2 and 3. The common routine is tied into each test by initialization procedures which set the Index location to a value that will produce the proper counter address according to the Time Test being performed. The programmed functions of the common routine are executed in the order described below.

a. Clears the DSKY Registers and displays the test number in position 3 of DSKY Register 1. (Displays 3 for TTEST7, 4 for TTEST8, and 5 for TTEST9.)

b. Deposits positive zero into the TIME Counter under test.

c. Starts the external clock (FREQUENCY COUNTER) immediately after the TIME Counter increments to a count of 1.

d. Enters a sample loop through the TIME Counter location, and looks for a positive zero condition in the TIME Counter.

e. When the TIME Counter reaches positive zero, the program halts the external clock, and enters the DSKY display routine. The DSKY displays (Register 2 and 3) are read as one number 163, 830. This number will be displayed at the end of each Time Test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

87. Set the T12 COUNTER STOP switch to the ON position.

88. Transfer Control to Location 1332 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

89. Press the MONITOR indicator switch to the on (illuminated) position.

90. Press the CL Key.

91. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

92. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

93. Press the PROCEED button.

94. Verify the following events:

a. DSKY Register 1 displays a 3 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

95. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

96. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

97. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

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98. Set the T12 COUNTER STOP switch to the ON position.

99. Transfer Control to Location 1354 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

100. Press the MONITOR indicator switch to the on (illuminated) position.

101. Press the CL Key.

102. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

103. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

104. Press the PROCEED button.

105. Verify the following events:

a. DSKY Register 1 displays a 4 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

106. Verify the the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

107. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

108. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

109. Set the T12 COUNTER STOP switch to the ON position.

110. Transfer Control to Location 1357 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

111. Press the MONITOR indicator switch to the on (illuminated) position.

112. Press the CL Key.

113. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

114. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

115. Press the PROCEED button.

116. Verify the following events:

a. DSKY Register 1 displays a 5 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

117. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

118. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

119. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST10 AND 11 - PROGRAM ANALYSIS

TTEST10 measures the time required to decrement the TIME 6 Counter from positive full scale to minus zero. TTEST11 measures the time required to decrement the TIME 6 Counter from full scale to minus zero. The elapsed time measured should result in 10.23906 seconds in both tests. Both tests utilize a common routine to clear the DSKY display, set the TIME 3 Counter set Bit 16 of Channel 13, start the external counter, monitor TIME 6 for a minus zero, and stop the external counter. When performing these tests, the operational sequence starts with Time Test 10 (location 3, 1400) and stops when the results are displayed in DSKY Registers 2 and 3. The operator continues the program by Transferring Control to Time Test 11 (location 3, 1431). The program also stops on this test when the results are displayed in DSKY Registers 2 and 3. Between the two tests only the initialization procedures are different. During the initialization of Time Test 10, the TIME 6 counter is loaded with a positive full scale number. During the initialization of Time Test 11, the TIME 6 counter is loaded with a negative full scale number. The programmed functions of the routine common to both tests are executed in the order described below.

a. Deposits number (Positive Full Scale for TTEST10 and Negative Full Scale for TTEST11) into the TIME 6 Counter (location 0031).

b. Clears the DSKY Registers and displays the number 6 in position 3 of DSKY Register 1.

c. Sets a Positive Full Scale number into the TIME 3 Counter and CCS loops TIME 3 sampling for an increment back to zero.

d. After TIME 3 increments to zero, the program sets the Enable T6 Rupt (Bit 15, Channel 13) and starts the external counter (FREQUENCY COUNTER).

e. Enters a CCS loop through the TIME Counter location sampling for a minus zero.

f. Stops the external counter immediately after TIME 6 switches to minus zero and displays the number 10239 in DSKY Register 2 and 06000 in DSKY Register 3. This number will be displayed at the end of each test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement with ± 2 counts in the least significant counter position.

120. Set the FREQUENCY COUNTER FREQ-TIME switch to the third MS position. Verify that the decimal point is positioned between the second and third least significant counter digits, i.e., 00000.00.

121. Set the T12 COUNTER STOP switch to the ON position.

122. Transfer Control to Bank 3, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

123. Press the MONITOR indicator switch to the on (illuminated) position.

124. Press the CL Key.

125. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

126. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

127. Press the PROCEED button.

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128. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

129. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

130. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

131. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 10239.06 milliseconds within ± 2 counts in the least significant counter position. Stamp data sheet.

132. Set the T12 COUNTER STOP switch to the ON position.

133. Transfer Control to Bank 3, location 1431 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

134. Press the MONITOR indicator switch to the on (illuminated) position.

135. Press the CL Key.

136. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

137. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

138. Press the PROCEED button.

139. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

140. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

141. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

142. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count 10239.06 within ± 2 counts in the least significant counter position. Stamp data sheet.

TTEST12 - PROGRAM ANALYSIS

TTEST12 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 4. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-4 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 4 switches to zero and displays the number 07500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

143. Set the FREQUENCY COUNTER FREQ-TIME switch to the first μs position.

144. Set the T12 COUNTER STOP switch to the ON position.

145. Transfer Control to Bank 3 location 1433 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

146. Press the MONITOR indicator switch to the on (illuminated) position.

147. Press the CL Key.

148. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

149. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

150. Press the PROCEED button.

151. Verify the following events:

a. DSKY Register 1 displays 3-4 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

152. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

153. Verify that DSKY Register 2 displays 07500 with 00000 in DSKY Register 3. Stamp data sheet.

154. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 7500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST13 - PROGRAM ANALYSIS

TTEST13 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 5. The programmed functions of the test routine are in the order described below.

a. Clears the DSKY display and displays 3-5 in DSKY Register 1 positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

c. After TIME 3 increments to zero the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 5 Counter and enters a CCS loop through the TIME 5 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 5 switches to zero and displays the number 05000 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

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155. Set the T12 COUNTER STOP switch to the ON position.

156. Transfer Control to Bank 3, location 1454 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

157. Press the MONITOR indicator switch to the on (illuminated) position.

158. Press the CL Key.

159. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

160. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

161. Press the PROCEED button.

162. Verify the following events:

a. DSKY Register 1 displays 3-5 in positions 2 through 4.

b. The FREQUFNCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

163. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

164. Verify that DSKY Register 2 displays 05000 with 00000 in DSKY Register 3. Stamp data sheet.

165. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 5000 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST14 - PROGRAM ANALYSIS

TTEST14 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 1. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-1 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 1 Counter and enters a CCS loop through the TIME 1 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 1 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

166. Set the T12 COUNTER STOP switch to the ON position.

167. Transfer Control to Bank 3, location 1474 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

168. Press the MONITOR indicator switch to the on (illuminated) position.

169. Press the CL Key.

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170. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

171. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

172. Press the PROCEED button.

173. Verify the following events:

a. DSKY Register 1 displays 4-1 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

174. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

175. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

176. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST15 - PROGRAM ANALYSIS

TTEST15 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 2. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-2 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 2 Counter and enters a CCS loop through the TIME 2 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 2 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ± 2 counts in the least significant counter position.

177. Set the T12 COUNTER STOP switch to the ON position.

178. Transfer Control to Bank 3, location 1515 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

179. Press the MONITOR indicator switch to the on (illuminated) position.

180. Press the CL Key.

181. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

182. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

183. Press the PROCEED button.

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184. Verify the following events:

a. DSKY Register 1 display 4-2 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

185. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

186. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

187. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST16 - PROGRAM ANALYSIS

TTEST16 measures the time elapse (phase) between the incrementing of TIME 3 and TIME 6. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-6 in DSKY Register 1, positions 2 through 4.

b. Deposits a Negative Full Scale number into the TIME 6 Counter and enables the T6 Rupt (Bit 16 of Channel 13).

c. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

d. After TIME 3 changes to zero, the program starts the external counter (FREQUENCY COUNTER) and inserts a 1 into the TIME 6 Counter.

e. Samples the TIME 6 Counter for a negative zero condition, and after detecting this condition, stops the external counter.

f. Displays the number 03125 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

188. Set the T12 COUNTER STOP switch to the ON position.

189. Transfer Control to Bank 3, location 1537 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

190. Press the MONITOR indicator switch to the on (illuminated) position.

191. Press the CL Key.

192. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

193. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

194. Press the PROCEED button.

195. Verify the following events:

a. DSKY Register 1 displays 3-6 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

196. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

197. Verify that DSKY Register 2 displays 03125 with 00000 in DSKY Register 3. Stamp data sheet.

198. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 312.5 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

WARNING TEST (WTEST) - PROGRAM ANALYSIS

The purpose of this test is to check the Warning Alarm. Upon entering the test, the state of the Warning Alarm is examined. If the Warning Alarm has been set the program will energize the Computer Activity (COMP ACTY) indicator on the DSKY. A Warning Alarm condition will also illuminate the AGC ALARMS indicator 9 on the LOGIC DRAWER NO. 1 panel of the CTS. The program then provides a 15 second delay during which, the Warning Light should be extinguished (if illuminated). If the Warning Light is still on at the end of this period, the program will enter the STOP Fail routine and the test will be terminated. If the preliminary check was successful, eight additional checks will be performed. Failure of anyone of these checks is indicated in the form of a (15 second) display in DSKY Register 1 without terminating the test. A failure indication is characterized by a 9-displayed in positions 2 and 3 followed by the check number in position 4. (For example if Check #1 fails, Register 1 will display 9-1.) After the failure indication has been displayed for 15 seconds the program will continue on to the next check. The eight checks employ the same philosophy. Each is concerned with pulsing the test alarm bit every "Y" seconds over a period of "Z" seconds. The state of the warning bit is examined at the end of the "Z" seconds and, if it is not what is expected, there is a 15 second fail display.

Each time the Test Alarm bit is pulsed (i.e., every "Y" seconds during a check), the state of the warning bit is checked. The COMP ACTY indicator on the DSKY is then used to indicate the condition of the warning bit. If the warning bit is on the COMP ACTY indicator will be turned on. If the warning bit is off the COMP ACTY indicator will be extinguished.

During the performance of a particular check, the DSKY will display the following:

R1 = 8- "test #(1-8)"

R2 = "Y" - how often the test alarm bit is being pulsed (shown in seconds and hundredths of seconds)

R3 = "Z" - length of time over which the alarm bit is pulsed (in seconds).

At the end of the check, R2 and R3 are blanked and, if success, 8-"test #" remains in R1. Otherwise R1 becomes 9- "test #".

The specifications for each check are shown in table 1.

Table 1. Alarm Test Specifications

Check No.	R1 Display	R2 (Y)*	R3 (Z)	Initial Warning State	End Expected Warning State
1	8-1	3.00	60	OFF	OFF
2	8-2	2.00	60	OFF	OFF or ON accepted
3	8-3	1.00	12	OFF	ON
4	8-4	0.16	1	OFF	ON
5	8-5	0.50	60	ON	ON
6	8-6	1.00	60	ON	ON
7	8-7	2.00	60	ON	OFF or ON accepted
8	8-8	3.00	60	ON	OFF

*(1 pulse every Y.YY secs. for ZZ seconds)

199. Set the T12 COUNTER STOP switch to the ON position.

200. Transfer Control to Bank 4, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

201. Press the MONITOR indicator switch to the on (illuminated) position.

202. Press the CL Key.

203. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

204. Press the PROCEED button.

205. Verify that the DSKY COMP ACTY indicator is illuminated and DSKY Register 1 displays 8-1.

206. Verify that the DSKY COMP ACTY indicator is extinguished and the DSKY Registers display the following:

Register	Display
1	8-1
2	00300
3	00060

207. Verify that DSKY Registers 2 and 3 are blanked and 8-1 remains in DSKY Register 1. Stamp data sheet.

NOTE: Several checks to follow have extremely short DSKY display times. It is suggested that verification of these checks be initially recorded by a check mark on the JDC sheet itself. The data sheet is then stamped immediately on the conclusion of the WARNING test.

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208. Verify that the DSKY Registers display the following:

Register	Display
1	8-2
2	00200
3	00060

209. Verify that the DSKY COMP ACTY indicator is illuminated but extinguishes in less than a minute.

210. Verify that DSKY Registers 2 and 3 are blanked with 8-2 still in DSKY Register 1. Stamp data sheet.

211. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-3
2	00100
3	00012

212. Verify that DSKY Registers 2 and 3 are blanked, the COMP ACTY indicator is extinguished, and DSKY Register 1 still displays 8-3. Stamp data sheet.

213. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-4
2	00016
3	00001

Stamp data sheet.

214. Verify that the DSKY Registers display the following:

Register	Display
1	8-5
2	00050
3	00060

215. Verify that the DSKY COMP ACTY indicator is illuminated.

216. Verify that the DSKY Registers 2 and 3 are blanked, the DSKY COMP ACTY indicator is still illuminated, and DSKY Register 1 still displays 8-5. Stamp data sheet.

217. Verify that the DSKY Register 1 is blanked and the COMP ACTY indicator is extinguished.

218. Verify that the DSKY Registers display the following:

Register	Display
1	8-6
2	00100
3	00060

219. Verify that the COMP ACTY indicator is illuminated.

220. Verify that DSKY Registers 2 and 3 are blanked with the COMP ACTY indicator still illuminated and 8-6 is still displayed in Register 1. Stamp data sheet.

221. Verify that the COMP ACTY indicator is extinguished and the DSKY Registers now display the following:

Register	Display
1	8-7
2	00200
3	00060

---

222. Verify that the COMP ACTY indicator illuminates.

223. Verify that DSKY Registers 2 and 3 are blanked with 8-7 still displayed in DSKY Register 1. Stamp data sheet.

224. Verify that the COMP ACTY indicator extinguishes.

225. Verify that DSKY Register 1 flashes 8-7 once.

226. Verify that the DSKY Registers now display the following:

Register	Display
1	8-8
2	00300
3	00060

227. Verify that the DSKY Registers 2 and 3 are blanked with 8-8 still displayed in Register 1.

228. Verify that DSKY Registers now display the following success indication.

Register	Display
1	8-8
2	99999
3	99999

Stamp data sheet.

229. A failure indication of any one of the eight checks will be displayed in DSKY Register 1 at the end of that particular check. The failure display will be an 8-9 presented in positions 2 through 4 of Register 1. In the event a failure occurs rerun the test by performing steps 199 through 204 again. If the failure reoccurs discontinue further testing.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 8

JDC
NO. 05773
REV. B
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

ASSEMBLY UNDER TEST
TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY
DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
18.	TTEST4 - Ready for Standby	FREQUENCY COUNTER is counting. DSKY Register 1 is 24-4. DSKY Register 2 and 3 are blank.	
21.	TTEST4 - Amount of time spent in Standby	Computer operated in the Standby mode for a period of	
22.	TTEST4 - Out of Standby	DSKY STBY indicator extinguishes	
28.	TTEST4 - Measurement	FREQUENCY COUNTER totals	
29.	TTEST4 - DSKY Display - Calculations	Registers 2 and 3 displays DSKY NUM/32	
31.	TTEST4 - Evaluation	The data recorded in step 28 agrees with the results of the Calculations of step 29 within ± 0.2 milliseconds.	
39.	TTEST1 - Start Check	DSKY Register 1 is 24-1, FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	

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EQUIPMENT TEST
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JDC
NO. 05773
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Step	Parameter	Specification	Results
40.	TTEST1 - Measurement	FREQUENCY COUNTER totals	
41.	TTEST1 - DSKY Displays	5120	
42.	TTEST1 - Evaluation	Results in steps 40 and 41 are within ±2 counts in the least significant counter position.	
50.	TTEST2 - Start Check	DSKY Register 1 is 24-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
51.	TTEST2 - Measurement	FREQUENCY COUNTER totals	
52.	TTEST2 - DSKY Displays	00010	
53.	TTEST2 - Evaluation	Results in steps 51 and 52 are within ±2 counts in the least significant counter position.	
61.	TTEST3 - Start Check	DSKY Register 1 is 24-3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
62.	TTEST3 - Measurement	FREQUENCY COUNTER totals	
63.	TTEST3 - DSKY Displays	5120	
64.	TTEST3 - Evaluation	Results in steps 62 and 63 are within ±2 counts in the least significant counter position.	

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DATA SHEET 3 OF 8

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NO. 05773
REV. B

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
72.	TTEST5 - Start Check	DSKY Register 1 is 1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
73.	TTEST5 - Measurement	FREQUENCY COUNTER totals	
74.	TTEST5 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
75.	TTEST5 - Evaluation	Results in steps 73 and 74 are within ±2 counts in the least significant counter position.	
83.	TTEST6 - Start Check	DSKY Register 1 is 2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
84.	TTEST6 - Measurement	FREQUENCY COUNTER totals	
85.	TTEST6 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
86.	TTEST6 - Evaluation	Results in steps 84 and 85 are within ± 2 counts in the least significant counter position.	
94.	TTEST7 - Start Check	DSKY Register 1 is 3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
95.	TTEST7 - Measurement	FREQUENCY COUNTER totals	

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Step	Parameter	Specification	Results
96.	TTEST7 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
97.	TTEST7 - Evaluation	Results in steps 95 and 96 are within ±2 counts in the least significant counter position.	
105.	TTEST8 - Start Check	DSKY Register 1 is 4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
106.	TTEST8 - Measurement	FREQUENCY COUNTER totals	
107.	TTEST8 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
108.	TTEST8 - Evaluation	Results in steps 106 and 107 are within ±2 counts in the least significant counter position.	
116.	TTEST9 - Start Check	DSKY Register 1 is 5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
117.	TTEST9 - Measurement	FREQUENCY COUNTER totals	
118.	TTEST9 - DSKY Displays	Reg. 2 = 16383, Reg. 3 - 00000	
119.	TTEST9 - Evaluation	Results in steps 117 and 118 are within ±2 counts in the least significant counter position.	

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Step	Parameter	Specification	Results
128.	TTEST10 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
129.	TTEST10 - Measurement	FREQUENCY COUNTER totals	
130.	TTEST10 - DSKY Displays	Reg. 2 = 10239, Reg. 3 - 06000	
131.	TTEST10 - Evaluation	Results in steps 129 and 130 are within ±2 counts in the least significant counter position.	
139.	TTEST11 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
140.	TTEST11 - Measurement	FREQUENCY COUNTER totals	
141.	TTEST11 - DSKY Displays	Reg. 2 = 10239, Reg. 3 = 06000	
142.	TTEST11 - Evaluation	Results in steps 140 and 141 are within ±2 counts in the least significant counter position.	
151.	TTEST12 - Start Check	DSKY Register 1 is 3-4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
152.	TTEST12 - Measurement	FREQUENCY COUNTER totals	

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JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
153.	TTEST12 - DSKY Displays	Reg. 2 = 07500, Reg. 3 = 00000	
154.	TTEST12 - Evaluation	Results in steps 152 and 153 are within ±2 counts in the least significant counter position.	
162.	TTEST13 - Start Check	DSKY Register 1 is 3-5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
163.	TTEST13 - Measurement	FREQUENCY COUNTER totals	
164.	TTEST13 - DSKY Displays	Reg. 2 = 05000, Reg. 3 = 00000	
165.	TTEST13 - Evaluation	Results in steps 163 and 164 are within ±2 counts in the least significant counter position.	
173.	TTEST14 - Start Check	DSKY Register 1 is 4-1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
174.	TTEST14 - Measurement	FREQUENCY COUNTER totals	
175.	TTEST14 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
176.	TTEST14 - Evaluation	Results in steps 174 and 175 are within ±2 counts in the least significant counter position.	

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Step	Parameter	Specification	Results
184.	TTEST15 - Start Check	DSKY Register 1 is 4-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
185.	TTEST15 - Measurement	FREQUENCY COUNTER totals	
186.	TTEST15 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
187.	TTEST15 - Evaluation	Results in steps 185 and 186 are within ±2 counts in the least significant counter position.	
195.	TTEST16 - Start Check	DSKY Register 1 is 3-6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
196.	TTEST16 - Measurement	FREQUENCY COUNTER totals	
197.	TTEST16 - DSKY Displays	Reg. 2 = 03125, Reg. 3 = 00000	
198.	TTEST16 - Evaluation	Results in steps 196 and 197 are within ±2 counts in the least significant counter position.	
207.	WTEST Check No. 1	DSKY Register 1 is 8-1. DSKY Registers 2 and 3 are blank.	
210.	WTEST Check No. 2	DSKY Register 1 is 8-2 and Flashes twice. DSKY Registers 2 and 3 are blank.	

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Step	Parameter	Specification	Results
212.	WTEST Check No. 3	DSKY Register 1 is 8-3. DSKY Registers 2 and 3 are blank.	
213.	WTEST Check No. 4	DSKY Register 1 is 8-4. DSKY Registers 2 and 3 are 00016 and 00001 respectively.	
216.	WTEST Check No. 5	DSKY Register 1 is 8-5. DSKY Registers 2 and 3 are blank.	
220.	WTEST Check No. 6	DSKY Register 1 is 8-6. DSKY Registers 2 and 3 are blank. DSKY COMP ACTY is on.	
223.	WTEST Check No. 7	DSKY Register 1 is 8-7. DSKY Registers 2 and 3 are blank.	
228.	WTEST8 and Success Display	DSKY Register 1 is 8-8. DSKY Register 2 is 99999. DSKY Register 3 is 99999.	

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JOB OPERATING PROCEDURE FOR (FVP)
PROGRAM-TIME AND WARNING CHECKS

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INITIAL TDRR 32809 D.S. PGS 8

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION Tests the outputs of both the High-order (Channel 3) and Low-order (Channel 4) scalers, along with Time Counters T2 through T6. E Memory retention in the Standby mode is checked during the scaler test. The last section of this test checks the operation of the warning alarm. A brief analysis is included as a preface to each specific test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	4/20/67	33626	1	-	EA	-
B	10/12/67	34824	2,4-16,18,20	8	EA	-
C	10/20/67	34887	1,11-16,18	-	EA	-

REFERENCES JDC's 05406, 05407, 05412, 05413, 05414, 05403
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program TIME AND WARNING CHECKS Mylar Tape, JDC 05774

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the FREQUENCY COUNTER.

3. On the XY Interface Panel:

a. Set the CHANNEL T switches to position 211.

b. Set the FREQ + PHASE switch to the FRT T →S position.

4. Prepare the CTS FREQUENCY COUNTER for operation as specified by JDC 05403, and verify that coaxial cables are present and connected as follows:

XY Interface Panel CNTR-A Jack	to	A20 Panel CNTR A Jack
Frequency Counter FREQ A - DC Jack	to	A20 Panel CNTR A Jack

5. On the FREQUENCY COUNTER set: FUNCTION switch to PERIOD A FREQ-TIME switch to MSEC TRIGGER LEVEL vernier for display of 312.5 ±1.0.

6. Set CHANNEL T switches to position 212, and set the FREQUENCY COUNTER FUNCTION switch to the PERIOD A position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

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SUBSYSTEM Computer

ASSY Block II - C Computer

7. Set the FREQ - TIME switch to the MS scale-center position. Verify that the Display decimal point is located between the first and second least significant digits, i. e., 000000.0. Set the DISPLAY Control to the maximum clockwise position.

8. Load Program TIME AND WARNING CHECKS (JDC 05774) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

9. Rewind tape and verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).

10. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

TTEST4-PROGRAM ANALYSIS Loads E BANKS with CHECKERS. The external (FREQUENCY COUNTER) clock is triggered and Channels 3 and 4 are stored in location 0065 and 0066. The computer then waits for the operator to switch to Standby. After Standby an operator TC to 0373 will resume the program, storing the updated scaler count in locations 67 and 70, stopping the external Counter, and performing a CHECK SUM of E Memory CHECKERS. If the CHECKSUM is correct, program will subtract 0065 from 0067 and 0066 from 0070 and display the total difference in DSKY Register 2 and 3. In order to convert the DSKY count to milliseconds the operator must divide it by 32 out to 7 places. The quotient is then compared with the count displayed on the Frequency counter to verify scaler continuity during standby.

11. Transfer Control to Location 0250 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

12. Press the MONITOR indicator switch to the on (illuminated) position.

13. Press the CL Key.

14. Press the RESET button on the FREQUENCY COUNTER and Verify the display is zeroed.

15. Set the T12 COUNTER STOP switch to the OFF position.

16. Set the INHIBIT INCREMENTS switch to the OFF position.

17. Press the PROCEED button.

18. Let the computer run for approximately 10 seconds. Verify the conditions listed below are present by stamping data sheet.

a. FREQUENCY COUNTER is counting.

b. DSKY Register 1 displays 24-4.

c. DSKY Registers 2 and 3 are blank.

19. Hold down the DSKY STBY Key until the STBY indicator illuminates and time the interval. (Indicator should illuminate within 2.00 seconds after the STBY Key has been depressed.)

20. Set the T12 COUNTER STOP switch to the ON position.

21. Allow the computer to remain in the Standby mode for period longer than 3 minutes but less than 15 minutes. Record the amount of time spent in the Standby mode on the data sheet.

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

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SUBSYSTEM Computer

ASSY Block II - C Computer

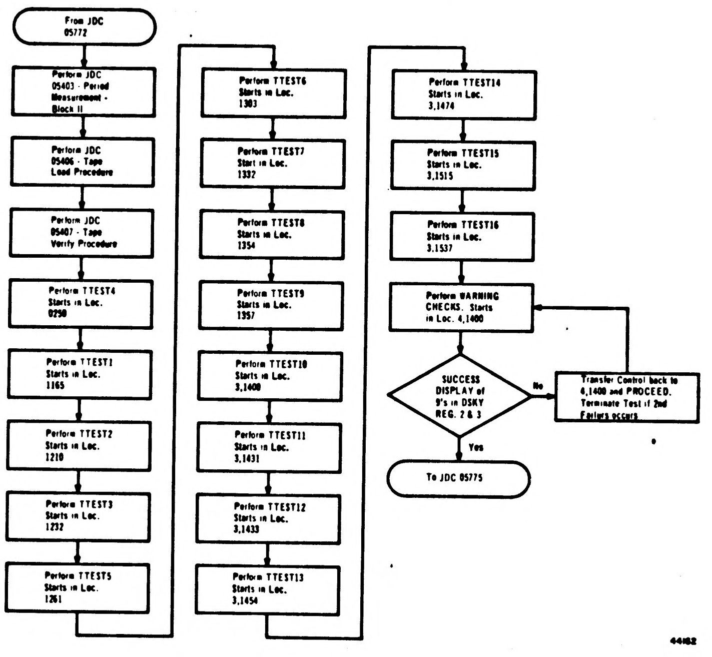
From JDC 05772
Perform JDC 05403 - Period Measurement - Block II
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 - Tape Verify Procedure
Perform TTEST4 Starts in Loc. 0250
Perform TTEST1 Starts in Loc. 1165
Perform TTEST2 Starts in Loc. 1210
Perform TTEST3 Starts in Loc. 1232
Perform TTEST5 Starts in Loc. 1261
Perform TTEST6 Starts in Loc. 1303
Perform TTEST7 Start in Loc. 1332
Perform TTEST8 Starts in Loc. 1354
Perform TTEST9 Starts in Loc. 1357
Perform TTEST10 Starts in Loc. 3,1400
Perform TTEST11 Starts in Loc. 3,1431
Perform TTEST12 Starts in Loc. 3,1433
Perform TTEST13 Starts in Loc. 3,1454
Perform TTEST14 Starts in Loc. 3,1474
Perform TTEST15 Starts in Loc. 3,1515
Perform TTEST16 Starts in Loc. 3,1537
Perform WARNING CHECKS. Starts in Loc. 4,1400
SUCCESS DISPLAY of 9's in DSKY REG. 2 & 3
No
Transfer Control back to 4,1400 and PROCEED. Terminate Test if 2nd Failure occurs
Yes
To JDC 05775
44462

Figure 1. Flowchart for Performing Program TIME AND WARNING CHECKS

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

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SUBSYSTEM Computer

ASSY Block II - C Computer

22. Hold down the DSKY STBY Key until the STBY indicator extinguishes. Stamp data sheet.

23. Transfer Control to Location 0373 using the procedures of JDC 05412.

24. Press the MONITOR indicator switch to the on (illuminated) position.

25. Press the CL Key.

26. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

27. Press the PROCEED button.

28. Verify that the FREQUENCY COUNTER stops counting and immediately record total count.

29. Verify that DSKY Registers 2 and 3 display a number (with a minimum of eight digits total). Record the number on the data sheet. Also divide the DSKY number by 32 and record results on the data sheet.

30. If the DSKY displays all 9's in Registers 2 and 3 the computer has failed the CHECKER BOARD CHECKSUM portion of this test. Proceed to step 7 of this procedure and perform all successive steps again. If the test fails again discontinue further testing.

31. Compare results of steps 28 and 29. Stamp data sheet.

TTEST1 - PROGRAM ANALYSIS

This test segment checks the time required for Channel 4 to count from zero, to full scale. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-1 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER.) The program then re-enters the same Channel 4 full scale check subroutine described above. Immediately after Channel 4 increments through zero again, the program retriggers the external clock, halts the time counter, and sets up the number 5120 in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement with ± 2 counts in the least significant position.

32. Set the T12 COUNTER STOP switch to the ON position.

33. Transfer Control to Location 1165 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

34. Press the MONITOR indicator switch to the on (illuminated) position.

35. Press the CL Key.

36. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

37. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

38. Press the PROCEED button.

39. Verify the following events:

a. DSKY Register 1 displays 24-1.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

40. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

41. Verify that the DSKY Register 2 Displays 5120. Stamp data sheet.

42. Verify that the number displayed on the FREQUENCY COUNTER equals the DSKY number 5120 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST2 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 4 to count from zero to 32. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-2 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). The program then reenters the same Channel 4 full scale check subroutine described above, except that an octal 37 is used for a constant in place of the full scale constant. (Octal 37 is equal to decimal 31.) Immediately after Channel 4 reaches the 32nd count, the program retriggers the external clock, halts the time counter, and sets up the number 10 (00010) in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (00010) by the DSKY and verifying agreement within ±2 counts in the least significant position.

43. Set the T12 COUNTER STOP switch to the ON position.

44. Transfer Control to Location 1210 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

45. Press the MONITOR indicator switch to the on (illuminated) position.

46. Press the CL Key.

47. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

48. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

49. Press the PROCEED button.

50. Verify the following events:

a. DSKY Register 1 displays 24-2.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

51. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

52. Verify that the DSKY Register 2 displays 00010. Stamp data sheet.

53. Verify the number displayed on the FREQUENCY COUNTER equals the DSKY number (00010) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST3 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 3 to increment once. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-3 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). After activating the FREQUENCY COUNTER the program sets up the number 5120 in DSKY display Register 2. The program then stores the contents of Channel 3 into Register L and enters a negative 1 into location 0075 to be Indexed later. The program enters a subroutine monitoring the state of Channel 3. This subroutine is similar to the one described above except that the RXOR instruction is transformed to RXOR Channel 3 (instead of 4) by the -1 in the Index location. As soon as a difference is detected in the value of Channel 3 (caused by an increment pulse) the program will retrigger the external clock halting the time measurement. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement within ±2 counts in the least significant position.

54. Set the T12 COUNTER STOP switch to the ON position.

55. Transfer Control to Location 1232 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

56. Press the MONITOR indicator switch to the on (illuminated) position.

57. Press the CL Key.

58. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

59. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

60. Press the PROCEED button.

61. Verify the following events:

a. DSKY Register 1 displays 24-3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

62. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

63. Verify that the DSKY Register 2 displays 5120. Stamp data sheet.

64. Verify that the number displayed on the number (5120) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST5 - PROGRAM ANALYSIS

The program routines comprising Time Test 5 are designed to measure the time required for the TIME 1 Counter to count from 1, through full scale, and back to zero. The TTEST5 programmed test functions and executed in the order listed below.

a. Clears the DSKY Registers and displays the number 1 in position 3 of DSKY Register 1.

b. Deposits zeros in location 0025 (TIME 1 Counter) and sample loops 0025 for the first count (or a count of 1).

c. Detecting a count of 1, the program will switch to a subroutine to start the external clock (FREQUENCY COUNTER). After starting the external clock the program returns to a sample loop, this time testing for a positive zero condition in 0025.

d. Detecting that 0025 is positive zero, the program switches to a subroutine to stop the external clock. The program then enters a display routine which places the number 16383 in DSKY Register 2, and 00000 in DSKY Register 3. The DSKY displays (Registers 2 and 3) are read as one number, 163, 830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

65. Set the T12 COUNTER STOP switch to the ON position.

66. Transfer Control to Location 1261 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

67. Press the MONITOR indicator switch to the on (illuminated) position.

68. Press the CL Key.

69. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

70. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position

71. Press the PROCEED button.

72. Verify the following events:

a. DSKY Register 1 displays a 1 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

73. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

74. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

75. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830. 0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST6 - PROGRAM ANALYSIS

The program routines comprising Time Test 6 are designed to measure the time required for the TIME2 Counter to count from 1, through full scale, and back to zero. The TTEST6 programmed test functions are executed in the order described below.

a. Clears the DSKY Registers and displays the number 2 in position 3 of DSKY Register 1.

b. Starts the external clock (FREQUENCY COUNTER) immediately after the next transition of the TIME 1 counter.

c. Deposits a count of 1 into the TIME 2 Counter.

d. Deposits a positive full scale (37777) number into the TIME 1 counter.

e. Enters a sample loop through TIME 1, waiting for the TIME 1 Counter to increment from full scale to zero. This transition indicates that the TIME 2 Counter has been incremented.

f. When the TIME 1 Counter switches to zero, the program will check the TIME 2 Counter for a positive zero condition. If positive zero is not present in the TIME 2 Counter, the program will form a jump loop cycling through the functions described in d and e above, until such time as the TIME 2 Counter is finally incremented back to zero.

g. When a positive zero condition is detected (approximately 163, 830 milliseconds later) in the TIME 2 Counter, the program will continue on, first halting the FREQUENCY COUNTER and then entering the DSKY display routine. The DSKY displays (registers 2 and 3) are read as one number, 163, 830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

76. Set the T12 COUNTER STOP switch to the ON position.

77. Transfer Control to Location 1303 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

78. Press the MONITOR indicator switch to the on (illuminated) position.

79. Press the CL Key.

80. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

81. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

82. Press the PROCEED button.

83. Verify the following events:

a. DSKY Register 1 displays a 2 in position 3.

b. The FREQUENCY COUNTER IS counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

84. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

85. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

86. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830. 0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST7, 8, and 9 - PROGRAM ANALYSIS

TTEST7 measures the time required to increment the TIME 3 Counter from 1, through full scale, and back to zero. TTEST8 measures the time required to increment the TIME 4 Counter from 1, through fully scale, and back to zero. TTEST9 measures the time required to increment the TIME 5 Counter from 1, through full scale, and back to zero. When performing these combined tests the operational sequence starts with Time Test 7 (location 1332), and after the results are displayed the program is continued by a manual Transfer of Control to location 1354 (Time Test 8). After obtaining the results of this test, the program is continued by another manual Transfer of Control to location 1357 for Time Test 9.

All three tests utilize a common routine which clears the DSKY display, starts the external counter after 1 is detected in the TIME Counter being tested, stops the external counter after zero is detected in the TIME Counter under test, and displays the specified elapsed time in DSKY Registers 2 and 3. The common routine is tied into each test by initialization procedures which set the Index location to a value that will produce the proper counter address according to the Time Test being performed. The programmed functions of the common routine are executed in the order described below.

a. Clears the DSKY Registers and displays the test number in position 3 of DSKY Register 1. (Displays 3 for TTEST7, 4 for TTEST8, and 5 for TTEST9.)

b. Deposits positive zero into the TIME Counter under test.

c. Starts the external clock (FREQUENCY COUNTER) immediately after the TIME Counter increments to a count of 1.

d. Enters a sample loop through the TIME Counter location, and looks for a positive zero condition in the TIME Counter.

e. When the TIME Counter reaches positive zero, the program halts the external clock, and enters the DSKY display routine. The DSKY displays (Register 2 and 3) are read as one number 163,830. This number will be displayed at the end of each Time Test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

87. Set the T12 COUNTER STOP switch to the ON position.

88. Transfer Control to Location 1332 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

89. Press the MONITOR indicator switch to the on (illuminated) position.

90. Press the CL Key.

91. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

92. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

93. Press the PROCEED button.

94. Verify the following events:

a. DSKY Register 1 displays a 3 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

95. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

96. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

97. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

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98. Set the T12 COUNTER STOP switch to the ON position.

99. Transfer Control to Location 1354 using the procesures of JDC 05412 (Transfer Control Operating Procedure).

100. Press the MONITOR indicator switch to the on (illuminated) position.

101. Press the CL Key.

102. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

103. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

104. Press the PROCEED button.

105. Verify the following events:

a. DSKY Register 1 displays a 4 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

106. Verify the the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

107. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

108. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

109. Set the T12 COUNTER STOP switch to the ON position.

110. Transfer Control to Location 1357 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

111. Press the MONITOR indicator switch to the on (illuminated) position.

112. Press the CL Key.

113. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

114. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

115. Press the PROCEED button.

116. Verify the following events:

a. DSKY Register 1 displays a 5 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

117. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

118. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

119. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST10 AND 11 - PROGRAM ANALYSIS

TTEST10 measures the time required to decrement the TIME 6 Counter from positive full scale to minus zero. TTEST11 measures the time required to decrement the TIME 6 Counter from full scale to minus zero. The elapsed time measured should result in 10.23906 seconds in both tests. Both tests utilize a common routine to clear the DSKY display, set the TIME 3 Counter set Bit 16 of Channel 13, start the external counter, monitor TIME 6 for a minus zero, and stop the external counter. When performing these tests, the operational sequence starts with Time Test 10 (location 3,1400) and stops when the results are displayed in DSKY Registers 2 and 3. The operator continues the program by Transferring Control to Time Test 11 (location 3,1431). The program also stops on this test when the results are displayed in DSKY Registers 2 and 3. Between the two tests only the initialization procedures are different. During the initialization of Time Test 10, the TIME 6 counter is loaded with a positive full scale number. During the initialization of Time Test 11, the TIME 6 counter is loaded with a negative full scale number. The programmed functions of the routine common to both tests are executed in the order described below.

a. Deposits number (Positive Full Scale for TTEST10 and Negative Full Scale for TTEST11) into the TIME 6 Counter (location 0031).

b. Clears the DSKY Registers and displays the number 6 in position 3 of DSKY Register 1.

c. Sets a Positive Full Scale number into the TIME 3 Counter and CCS loops TIME 3 sampling for an increment back to zero.

d. After TIME 3 increments to zero, the program sets the Enable T6 Rupt (Bit 15, Channel 13) and starts the external counter (FREQUENCY COUNTER).

e. Enters a CCS loop through the TIME Counter location sampling for a minus zero.

f. Stops the external counter immediately after TIME 6 switches to minus zero and displays the number 10239 in DSKY Register 2 and 06000 in DSKY Register 3. This number will be displayed at the end of each test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement with ± 2 counts in the least significant counter position.

120. Set the FREQUENCY COUNTER FREQ-TIME switch to the third MS position. Verify that the decimal point is positioned between the second and third least significant counter digits, i.e., 00000.00.

121. Set the T12 COUNTER STOP switch to the ON position.

122. Transfer Control to E Bank 3, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

123. Press the MONITOR indicator switch to the on (illuminated) position.

124. Press the CL Key.

125. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

126. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

127. Press the PROCEED button.

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128. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

129. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

130. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

131. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 10239.06 milliseconds within ± 2 counts in the least significant counter position. Stamp data sheet.

132. Set the T12 COUNTER STOP switch to the ON position.

133. Transfer Control to E Bank 3, location 1431 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

134. Press the MONITOR indicator switch to the on (illuminated) position.

135. Press the CL Key.

136. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

137. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

138. Press the PROCEED button.

139. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

140. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

141. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

142. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count 10239.06 within ± 2 counts in the least significant counter position. Stamp data sheet.

TTEST12 - PROGRAM ANALYSIS

TTEST12 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 4. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-4 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 4 switches to zero and displays the number 07500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

143. Set the FREQUENCY COUNTER FREQ-TIME switch to the first µs position.

144. Set the T12 COUNTER STOP switch to the ON position.

145. Transfer Control to E Bank 3 location 1433 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

146. Press the MONITOR indicator switch to the on (illuminated) position.

147. Press the CL Key.

148. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

149. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

150. Press the PROCEED button.

151. Verify the following events:

a. DSKY Register 1 displays 3-4 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

152. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

153. Verify that DSKY Register 2 displays 07500 with 00000 in DSKY Register 3 Stamp data sheet.

154. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 7500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST13 - PROGRAM ANALYSIS

TTEST13 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 5. The programmed functions of the test routine are in the order described below.

a. Clears the DSKY display and displays 3-5 in DSKY Register 1 positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 5 Counter and enters a CCS loop through the TIME 5 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 5 switches to zero and displays the number 05000 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

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155. Set the T12 COUNTER STOP switch to the ON position.

156. Transfer Control to E Bank 3, location 1454 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

157. Press the MONITOR indicator switch to the on (illuminated) position.

158. Press the CL Key.

159. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

160. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

161. Press the PROCEED button.

162. Verify the following events:

a. DSKY Register 1 displays 3-5 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

163. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

164. Verify that DSKY Register 2 displays 05000 with 00000 in DSKY Register 3. Stamp data sheet.

165. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 5000 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST14 - PROGRAM ANALYSIS

TTEST14 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 1. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-1 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 1 Counter and enters a CCS loop through the TIME 1 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 1 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

166. Set the T12 COUNTER STOP switch to the ON position.

167. Transfer Control to E Bank 3, location 1474 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

168. Press the MONITOR indicator switch to the on (illuminated) position.

169. Press the CL Key.

---

170. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

171. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

172. Press the PROCEED button.

173. Verify the following events:

a. DSKY Register 1 displays 4-1 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

174. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

175. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

176. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST15 - PROGRAM ANALYSIS

TTEST15 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 2. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-2 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 2 Counter and enters a CCS loop through the TIME 2 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 2 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

177. Set the T12 COUNTER STOP switch to the ON position.

178. Transfer Control to E Bank 3, location 1515 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

179. Press the MONITOR indicator switch to the on (illuminated) position.

180. Press the CL Key.

181. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

182. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

183. Press the PROCEED button.

---

184. Verify the following events:

a. DSKY Register 1 display 4-2 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

185. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

186. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

187. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST16 - PROGRAM ANALYSIS

TTEST16 measures the time elapse (phase) between the incrementing of TIME 3 and TIME 6. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-6 in DSKY Register 1, positions 2 through 4.

b. Deposits a Negative Full Scale number into the TIME 6 Counter and enables the T6 Rupt (Bit 16 of Channel 13).

c. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

d. After TIME 3 changes to zero, the program starts the external counter (FREQUENCY COUNTER) and inserts a 1 into the TIME 6 Counter.

e. Samples the TIME 6 Counter for a negative zero condition, and after detecting this condition, stops the external counter.

f. Displays the number 03125 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

188. Set the T12 COUNTER STOP switch to the ON position.

189. Transfer Control to E Bank 3, location 1537 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

190. Press the MONITOR indicator switch to the on (illuminated) position.

191. Press the CL Key.

192. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

193. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

194. Press the PROCEED button.

195. Verify the following events:

a. DSKY Register 1 displays 3-6 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

196. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

197. Verify that DSKY Register 2 displays 03125 with 00000 in DSKY Register 3. Stamp data sheet.

198. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 312.5 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

WARNING TEST (WTEST) - PROGRAM ANALYSIS

The purpose of this test is to check the Warning Alarm. Upon entering the test, the state of the Warning Alarm is examined. If the Warning Alarm has been set the program will energize the Computer Activity (COMP ACTY) indicator on the DSKY. A Warning Alarm condition will also illuminate the AGC ALARMS indicator 9 on the LOGIC DRAWER NO. 1 panel of the CTS. The program then provides a 15 second delay during which, the Warning Light should be extinguished (if illuminated). If the Warning Light is still on at the end of this period, the program will enter the STOP Fail routine and the test will be terminated. If the preliminary check was successful, eight additional checks will be performed. Failure of anyone of these checks is indicated in the form of a (15 second) display in DSKY Register 1 without terminating the test. A failure indication is characterized by a 9-displayed in positions 2 and 3 followed by the check number in position 4. (For example if Check #1 fails, Register 1 will display 9-1.) After the failure indication has been displayed for 15 seconds the program will continue on to the next check. The eight checks employ the same philosophy. Each is concerned with pulsing the test alarm bit every "Y" seconds over a period of "Z" seconds. The state of the warning bit is examined at the end of the "Z" seconds and, if it is not what is expected, there is a 15 second fail display.

Each time the Test Alarm bit is pulsed (i.e., every "Y" seconds during a check), the state of the warning bit is checked. The COMP ACTY indicator on the DSKY is then used to indicate the condition of the warning bit. If the warning bit is on the COMP ACTY indicator will be turned on. If the warning bit is off the COMP ACTY indicator will be extinguished.

During the performance of a particular check, the DSKY will display the following:

R1 = 8- "test #(1-8)"

R2 = "Y" - how often the test alarm bit is being pulsed (shown in seconds and hundredths of seconds)

R3 = "Z" - length of time over which the alarm bit is pulsed (in seconds).

At the end of the check, R2 and R3 are blanked and, if success, 8-"test #" remains in R1. Otherwise R1 becomes 9- "test #".

The specifications for each check are shown in table 1.

Table 1. Alarm Test Specifications

Check No.	R1 Display	R2 (Y)*	R3 (Z)	Initial Warning State	End Expected Warning State
1	8-1	3.00	60	OFF	OFF
2	8-2	2.00	60	OFF	OFF or ON accepted
3	8-3	1.00	12	OFF	ON
4	8-4	0.16	1	OFF	ON
5	8-5	0.50	60	ON	ON
6	8-6	1.00	60	ON	ON
7	8-7	2.00	60	ON	OFF or ON accepted
8	8-8	3.00	60	ON	OFF

*(1 pulse every Y.YY secs. for ZZ seconds)

199. Set the T12 COUNTER STOP switch to the ON position.

200. Transfer Control to E Bank 4, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

201. Press the MONITOR indicator switch to the on (illuminated) position.

202. Press the CL Key.

203. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

204. Press the PROCEED button.

205. Verify that the DSKY COMP ACTY indicator is illuminated and DSKY Register 1 displays 8-1.

206. Verify that the DSKY COMP ACTY indicator is extinguished and the DSKY Registers display the following:

Register	Display
1	8-1
2	00300
3	00060

207. Verify that DSKY Registers 2 and 3 are blanked and 8-1 remains in DSKY Register 1. Stamp data sheet.

NOTE: Several checks to follow have extremely short DSKY display times. It is suggested that verification of these checks be initially recorded by a check mark on the JDC sheet itself. The data sheet is then stamped immediately on the conclusion of the WARNING test.

208. Verify that the DSKY Registers display the following:

Register	Display
1	8-2
2	00200
3	00060

209. Verify that the DSKY COMP ACTY indicator is illuminated but extinguishes in less than a minute.

210. Verify that DSKY Registers 2 and 3 are blanked with 8-2 still in DSKY Register 1. Stamp data sheet.

211. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-3
2	00100
3	00012

212. Verify that DSKY Registers 2 and 3 are blanked, the COMP ACTY indicator is extinguished, and DSKY Register 1 still displays 8-3. Stamp data sheet.

213. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-4
2	00016
3	00001

Stamp data sheet.

214. Verify that the DSKY Registers display the following:

Register	Display
1	8-5
2	00050
3	00060

215. Verify that the DSKY COMP ACTY indicator is illuminated.

216. Verify that the DSKY Registers 2 and 3 are blanked, the DSKY COMP ACTY indicator is still illuminated, and DSKY Register 1 still displays 8-5. Stamp data sheet.

217. Verify that the DSKY Register 1 is blanked and the COMP ACTY indicator is extinguished.

218. Verify that the DSKY Registers display the following:

Register	Display
1	8-6
2	00100
3	00060

219. Verify that the COMP ACTY indicator is illuminated.

220. Verify that DSKY Registers 2 and 3 are blanked with the COMP ACTY indicator still illuminated and 8-6 is still displayed in Register 1. Stamp data sheet.

221. Verify that the COMP ACTY indicator is extinguished and the DSKY Registers now display the following:

Register	Display
1	8-7
2	00200
3	00060

222. Verify that the COMP ACTY indicator illuminates.

223. Verify that DSKY Registers 2 and 3 are blanked with 8-7 still displayed in DSKY Register 1. Stamp data sheet.

224. Verify that the COMP ACTY indicator extinguishes.

225. Verify that DSKY Register 1 flashes 8-7 once.

226. Verify that the DSKY Registers now display the following:

Register	Display
1	8-8
2	00300
3	00060

227. Verify that the DSKY Registers 2 and 3 are blanked with 8-8 still displayed in Register 1.

228. Verify that DSKY Registers now display the following success indication.

Register	Display
1	8-8
2	99999
3	99999

Stamp data sheet.

229. A failure indication of any one of the eight checks will be displayed in DSKY Register 1 at the end of that particular check. The failure display will be an 8-9 presented in positions 2 through 4 of Register 1. In the event a failure occurs rerun the test by performing steps 199 through 204 again. If the failure reoccurs discontinue further testing.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 8

JDC
NO. 05773
REV. C
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

ASSEMBLY UNDER TEST

TITLE __________
SER. NO. ______ DWG ______ REV. ____

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME __________ SER. NO. ______ CAL DATE ______
NAME __________ SER. NO. ______ CAL DATE ______

CONDUCTED BY __________ NAME/AFFILIATION APPROVED BY __________ NAME/AFFILIATION

Step	Parameter	Specification	Results
18.	TTEST4 - Ready for Standby	FREQUENCY COUNTER is counting. DSKY Register 1 is 24-4. DSKY Register 2 and 3 are blank.	
21.	TTEST4 - Amount of time spent in Standby	Computer operated in the Standby mode for a period of	
22.	TTEST4 - Out of Standby	DSKY STBY indicator extinguishes	
28.	TTEST4 - Measurement	FREQUENCY COUNTER totals	
29.	TTEST4 - DSKY Display - Calculations	Registers 2 and 3 displays DSKY NUM/32	
31.	TTEST4 - Evaluation	The data recorded in step 28 agrees with the results of the Calculation of step 29 within ± 0.2 milliseconds.	
39.	TTEST1 - Start Check	DSKY Register 1 is 24-1, FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	

DATE 26 JAN 67

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 8

JDC
NO. 05773
REV. C

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
40.	TTEST1 - Measurement	FREQUENCY COUNTER totals	
41.	TTEST1 - DSKY Displays	5120	
42.	TTEST1 - Evaluation	Results in steps 40 and 41 are within ±2 counts in the least significant counter position.	
50.	TTEST2 - Start Check	DSKY Register 1 is 24-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
51.	TTEST2 - Measurement	FREQUENCY COUNTER totals	
52.	TTEST2 - DSKY Displays	00010	
53.	TTEST2 - Evaluation	Results in steps 51 and 52 are within ±2 counts in the least significant counter position.	
61.	TTEST3 - Start Check	DSKY Register 1 is 24-3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
62.	TTEST3 - Measurement	FREQUENCY COUNTER totals	
63.	TTEST3 - DSKY Displays	5120	
64.	TTEST3 - Evaluation	Results in steps 62 and 63 are within ±2 counts in the least significant counter position.	

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Step	Parameter	Specification	Results
72.	TTEST5 - Start Check	DSKY Register 1 is 1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
73.	TTEST5 - Measurement	FREQUENCY COUNTER totals	
74.	TTEST5 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
75.	TTEST5 - Evaluation	Results in steps 73 and 74 are within ±2 counts in the least significant counter position.	
83.	TTEST6 - Start Check	DSKY Register 1 is 2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
84.	TTEST6 - Measurement	FREQUENCY COUNTER totals	
85.	TTEST6 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
86.	TTEST6 - Evaluation	Results in steps 84 and 85 are within ± 2 counts in the least significant counter position.	
94.	TTEST7 - Start Check	DSKY Register 1 is 3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
95.	TTEST7 - Measurement	FREQUENCY COUNTER totals	

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Step	Parameter	Specification	Results
96.	TTEST7 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
97.	TTEST7 - Evaluation	Results in steps 95 and 96 are within ±2 counts in the least significant counter position.	
105.	TTEST8 - Start Check	DSKY Register 1 is 4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
106.	TTEST8 - Measurement	FREQUENCY COUNTER totals	
107.	TTEST8 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
108.	TTEST8 - Evaluation	Results in steps 106 and 107 are within ±2 counts in the least significant counter position.	
116.	TTEST9 - Start Check	DSKY Register 1 is 5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
117.	TTEST9 - Measurement	FREQUENCY COUNTER totals	
118.	TTEST9 - DSKY Displays	Reg. 2 = 16383, Reg. 3 - 00000	
119.	TTEST9 - Evaluation	Results in steps 117 and 118 are within ±2 counts in the least significant counter position.	

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Step	Parameter	Specification	Results
128.	TTEST10 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
129.	TTEST10 - Measurement	FREQUENCY COUNTER totals	
130.	TTEST10 - DSKY Displays	Reg. 2 = 10239, Reg. 3 - 06000	
131.	TTEST10 - Evaluation	Results in steps 129 and 130 are within ±2 counts in the least significant counter position.	
139.	TTEST11 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
140.	TTEST11 - Measurement	FREQUENCY COUNTER totals	
141.	TTEST11 - DSKY Displays	Reg. 2 = 10239, Reg. 3 = 06000	
142.	TTEST11 - Evaluation	Results in steps 140 and 141 are within ±2 counts in the least significant counter position.	
151.	TTEST12 - Start Check	DSKY Register 1 is 3-4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
152.	TTEST12 - Measurement	FREQUENCY COUNTER totals	

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Step	Parameter	Specification	Results
153.	TTEST12 - DSKY Displays	Reg. 2 = 07500, Reg. 3 = 00000	
154.	TTEST12 - Evaluation	Results in steps 152 and 153 are within ±2 counts in the least significant counter position.	
162.	TTEST13 - Start Check	DSKY Register 1 is 3-5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
163.	TTEST13 - Measurement	FREQUENCY COUNTER totals	
164.	TTEST13 - DSKY Displays	Reg. 2 = 05000, Reg. 3 = 00000	
165.	TTEST13 - Evaluation	Results in steps 163 and 164 are within ±2 counts in the least significant counter position.	
173.	TTEST14 - Start Check	DSKY Register 1 is 4-1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
174.	TTEST14 - Measurement	FREQUENCY COUNTER totals	
175.	TTEST14 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
176.	TTEST14 - Evaluation	Results in steps 174 and 175 are within ±2 counts in the least significant counter position.	

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Step	Parameter	Specification	Results
184.	TTEST15 - Start Check	DSKY Register 1 is 4-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
185.	TTEST15 - Measurement	FREQUENCY COUNTER totals	
186.	TTEST15 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
187.	TTEST15 - Evaluation	Results in steps 185 and 186 are within ±2 counts in the least significant counter position.	
195.	TTEST16 - Start Check	DSKY Register 1 is 3-6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
196.	TTEST16 - Measurement	FREQUENCY COUNTER totals	
197.	TTEST16 - DSKY Displays	Reg. 2 = 03125, Reg. 3 = 00000	
198.	TTEST16 - Evaluation	Results in steps 196 and 197 are within ±2 counts in the least significant counter position.	
207.	WTEST Check No. 1	DSKY Register 1 is 8-1. DSKY Registers 2 and 3 are blank.	
210.	WTEST Check No. 2	DSKY Register 1 is 8-2 and Flashes twice. DSKY Registers 2 and 3 are blank.	

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Step	Parameter	Specification	Results
212.	WTEST Check No. 3	DSKY Register 1 is 8-3. DSKY Registers 2 and 3 are blank.	
213.	WTEST Check No. 4	DSKY Register 1 is 8-4. DSKY Registers 2 and 3 are 00016 and 00001 respectively.	
216.	WTEST Check No. 5	DSKY Register 1 is 8-5. DSKY Registers 2 and 3 are blank.	
220.	WTEST Check No. 6	DSKY Register 1 is 8-6. DSKY Registers 2 and 3 are blank. DSKY COMP ACTY is on.	
223.	WTEST Check No. 7	DSKY Register 1 is 8-7. DSKY Registers 2 and 3 are blank.	
228.	WTEST8 and Success Display	DSKY Register 1 is 8-8. DSKY Register 2 is 99999. DSKY Register 3 is 99999.	

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OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS | JDC 05773 REV. D PAGE 1 OF 20
INITIAL TDRR 32809 D.S. PGS 8

SUBSYSTEM Computer | ASSY. Block II - C Computer

DESCRIPTION Tests the outputs of both the High-order (Channel 3) and Low-order (Channel 4) scalers, along with Time Counters T2 through T6. E Memory retention in the Standby mode is checked during the scaler test. The last section of this test checks the operation of the warning alarm. A brief analysis is included as a preface to each specific test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	4-20-67	33626	1	-	EA	-
B	10-12-67	34824	2,4-16,18,20	8	EA	-
C	10-20-67	34887	1, 11-16, 18	-	EA	-
D	3-29-68	35992	1, 2, 4	1	EA	-

REFERENCES JDC's 05406, 05407, 05412, 05413, 05414, 05403
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program TIME AND WARNING CHECKS Mylar Tape, JDC 05774

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the FREQUENCY COUNTER.

3. On the XY Interface Panel:

a. Set the CHANNEL T switches to position 211.

b. Set the FREQ + PHASE switch to the FRT T →S position.

4. Prepare the CTS FREQUENCY COUNTER for operation as specified by JDC 05403, and verify that coaxial cables are present and connected as follows:

XY Interface Panel	to	A20 Panel
CNTR-A jack		CNTR A jack
Frequency Counter	to	A20 Panel
FREQ A - DC jack		CNTR A jack

5. On the FREQUENCY COUNTER set:
FUNCTION switch to PERIOD A
FREQ-TIME switch to μS.
DISPLAY control to ∞.
TRIGGER LEVEL vernier for display of 312.5 ±1.0.

6. Set CHANNEL T switches to position 212, and set the FREQUENCY COUNTER FUNCTION switch to the PERIOD A position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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7. Set the FREQ - TIME switch to the MS scale-center position. Verify that the Display decimal point is located between the first and second least significant digits, i. e., 000000.0. Set the DISPLAY Control to the maximum clockwise position.

8. Load Program TIME AND WARNING CHECKS (JDC 05774) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

9. Rewind tape and verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).

10. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

TTEST4-PROGRAM ANALYSIS Loads E BANKS with CHECKERS. The external (FREQUENCY COUNTER) clock is triggered and Channels 3 and 4 are stored in location 0065 and 0066. The computer then waits for the operator to switch to Standby. After Standby an operator TC to 0373 will resume the program, storing the updated scaler count in locations 67 and 70, stopping the external Counter, and performing a CHECK SUM of E Memory CHECKERS. If the CHECKSUM is correct, program will subtract 0065 from 0067 and 0066 from 0070 and display the total difference in DSKY Register 2 and 3. In order to convert the DSKY count to milliseconds the operator must divide it by 32 out to 7 places. The quotient is then compared with the count displayed on the Frequency counter to verify scaler continuity during standby.

11. Transfer Control to Location 0250 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

12. Press the MONITOR indicator switch to the on (illuminated) position.

13. Press the CL Key.

14. Press the RESET button on the FREQUENCY COUNTER and Verify the display is zeroed.

15. Set the T12 COUNTER STOP switch to the OFF position.

16. Set the INHIBIT INCREMENTS switch to the OFF position.

17. Press the PROCEED button.

18. Let the computer run for approximately 10 seconds. Verify the conditions listed below are present by stamping data sheet.

a. FREQUENCY COUNTER is counting.

b. DSKY Register 1 displays 24-4.

c. DSKY Registers 2 and 3 are blank.

19. Hold down the DSKY PRO (STBY) Key until the STBY indicator illuminates and time the interval. (Indicator should illuminate within 2.00 seconds after the PRO (STBY) Key has been depressed.)

20. Set the T12 COUNTER STOP switch to the ON position.

21. Allow the computer to remain in the Standby mode for period longer than 3 minutes but less than 15 minutes. Record the amount of time spent in the Standby mode on the data sheet.

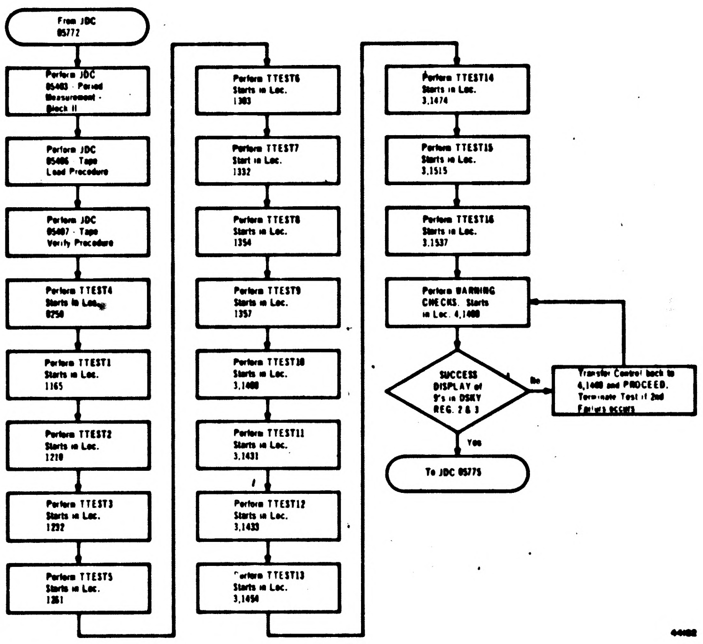
From JDC 05772
Perform JDC 05403 - Period Measurement - Block II
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 - Tape Verify Procedure
Perform TTEST4 Starts in Loc. 0250
Perform TTEST1 Starts in Loc. 1165
Perform TTEST2 Starts in Loc. 1210
Perform TTEST3 Starts in Loc. 1232
Perform TTEST5 Starts in Loc. 1261
Perform TTEST6 Starts in Loc. 1303
Perform TTEST7 Start in Loc. 1332
Perform TTEST8 Starts in Loc. 1354
Perform TTEST9 Starts in Loc. 1357
Perform TTEST10 Starts in Loc. 3,1400
Perform TTEST11 Starts in Loc. 3,1431
Perform TTEST12 Starts in Loc. 3,1433
Perform TTEST13 Starts in Loc. 3,1454
Perform TTEST14 Starts in Loc. 3,1474
Perform TTEST15 Starts in Loc. 3,1515
Perform TTEST16 Starts in Loc. 3,1537
Perform WARNING CHECKS. Starts in Loc. 4,1400
SUCCESS DISPLAY of 9's in DSKY REG. 2 & 3
No
Transfer Control back to 4,1400 and PROCEED. Terminate Test if 2nd Failure occurs
Yes
To JDC 05775
44402

Figure 1. Flowchart for Performing Program TIME AND WARNING CHECKS

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22. Depress and hold the DSKY PRO (STBY) Key for a minimum of three seconds or until the STBY indicator extinguishes, whichever occurs first. If STBY does not extinguish, release and depress again, up to a maximum of three times (RESTART may illuminate). Record on Data Sheet number of times DSKY PRO (STBY) Key was depressed.
A. On the CTS:
T12 STOP to OFF
Depress FRESH START
Depress PROCEED
Depress ALARM RESET
Set T12 STOP to ON.
B. Depress RSET KEY on DSKY.

23. Transfer Control to Location 0373 using the procedures of JDC 05412.

24. Press the MONITOR indicator switch to the on (illuminated) position.

25. Press the CL Key.

26. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

27. Press the PROCEED button.

28. Verify that the FREQUENCY COUNTER stops counting and immediately record total count.

29. Verify that DSKY Registers 2 and 3 display a number (with a minimum of eight digits total). Record the number on the data sheet. Also divide the DSKY number by 32 and record results on the data sheet.

30. If the DSKY displays all 9's in Registers 2 and 3 the computer has failed the CHECKER BOARD CHECKSUM portion of this test. Proceed to step 7 of this procedure and perform all successive steps again. If the test fails again discontinue further testing.

31. Compare results of steps 28 and 29. Stamp data sheet.

TTEST1 - PROGRAM ANALYSIS

This test segment checks the time required for Channel 4 to count from zero, to full scale. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-1 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER.) The program then re-enters the same Channel 4 full scale check subroutine described above. Immediately after Channel 4 increments through zero again, the program retriggers the external clock, halts the time counter, and sets up the number 5120 in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement with ± 2 counts in the least significant position.

32. Set the T12 COUNTER STOP switch to the ON position.

33. Transfer Control to Location 1165 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

34. Press the MONITOR indicator switch to the on (illuminated) position.

35. Press the CL Key.

36. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

37. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

38. Press the PROCEED button.

39. Verify the following events:

a. DSKY Register 1 displays 24-1.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

40. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

41. Verify that the DSKY Register 2 Displays 5120. Stamp data sheet.

42. Verify that the number displayed on the FREQUENCY COUNTER equals the DSKY number 5120 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST2 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 4 to count from zero to 32. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-2 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). The program then reenters the same Channel 4 full scale check subroutine described above, except that an octal 37 is used for a constant in place of the full scale constant. (Octal 37 is equal to decimal 31.) Immediately after Channel 4 reaches the 32nd count, the program retriggers the external clock, halts the time counter, and sets up the number 10 (00010) in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (00010) by the DSKY and verifying agreement within ±2 counts in the least significant position.

43. Set the T12 COUNTER STOP switch to the ON position.

44. Transfer Control to Location 1210 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

45. Press the MONITOR indicator switch to the on (illuminated) position.

46. Press the CL Key.

47. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

48. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

49. Press the PROCEED button.

50. Verify the following events:

a. DSKY Register 1 displays 24-2.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

51. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

52. Verify that the DSKY Register 2 displays 00010. Stamp data sheet.

53. Verify the number displayed on the FREQUENCY COUNTER equals the DSKY number (00010) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST3 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 3 to increment once. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-3 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). After activating the FREQUENCY COUNTER the program sets up the number 5120 in DSKY display Register 2. The program then stores the contents of Channel 3 into Register L and enters a negative 1 into location 0075 to be Indexed later. The program enters a subroutine monitoring the state of Channel 3. This subroutine is similar to the one described above except that the RXOR instruction is transformed to RXOR Channel 3 (instead of 4) by the -1 in the Index location. As soon as a difference is detected in the value of Channel 3 (caused by an increment pulse) the program will retrigger the external clock halting the time measurement. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement within ±2 counts in the least significant position.

54. Set the T12 COUNTER STOP switch to the ON position.

55. Transfer Control to Location 1232 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

56. Press the MONITOR indicator switch to the on (illuminated) position.

57. Press the CL Key.

58. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

59. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

60. Press the PROCEED button.

61. Verify the following events:

a. DSKY Register 1 displays 24-3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

62. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

63. Verify that the DSKY Register 2 displays 5120. Stamp data sheet.

64. Verify that the number displayed on the number (5120) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST5 - PROGRAM ANALYSIS

The program routines comprising Time Test 5 are designed to measure the time required for the TIME 1 Counter to count from 1, through full scale, and back to zero. The TTEST5 programmed test functions and executed in the order listed below.

a. Clears the DSKY Registers and displays the number 1 in position 3 of DSKY Register 1.

b. Deposits zeros in location 0025 (TIME 1 Counter) and sample loops 0025 for the first count (or a count of 1).

c. Detecting a count of 1, the program will switch to a subroutine to start the external clock (FREQUENCY COUNTER). After starting the external clock the program returns to a sample loop, this time testing for a positive zero condition in 0025.

d. Detecting that 0025 is positive zero, the program switches to a subroutine to stop the external clock. The program then enters a display routine which places the number 16383 in DSKY Register 2, and 00000 in DSKY Register 3. The DSKY displays (Registers 2 and 3) are read as one number, 163, 830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

65. Set the T12 COUNTER STOP switch to the ON position.

66. Transfer Control to Location 1261 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

67. Press the MONITOR indicator switch to the on (illuminated) position.

68. Press the CL Key.

69. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

70. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

71. Press the PROCEED button.

72. Verify the following events:

a. DSKY Register 1 displays a 1 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

73. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

74. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

75. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST6 - PROGRAM ANALYSIS

The program routines comprising Time Test 6 are designed to measure the time required for the TIME2 Counter to count from 1, through full scale, and back to zero. The TTEST6 programmed test functions are executed in the order described below.

a. Clears the DSKY Registers and displays the number 2 in position 3 of DSKY Register 1.

b. Starts the external clock (FREQUENCY COUNTER) immediately after the next transition of the TIME 1 counter.

c. Deposits a count of 1 into the TIME 2 Counter.

d. Deposits a positive full scale (37777) number into the TIME 1 counter.

e. Enters a sample loop through TIME 1, waiting for the TIME 1 Counter to increment from full scale to zero. This transition indicates that the TIME 2 Counter has been incremented.

f. When the TIME 1 Counter switches to zero, the program will check the TIME 2 Counter for a positive zero condition. If positive zero is not present in the TIME 2 Counter, the program will form a jump loop cycling through the functions described in d and e above, until such time as the TIME 2 Counter is finally incremented back to zero.

g. When a positive zero condition is detected (approximately 163, 830 milliseconds later) in the TIME 2 Counter, the program will continue on, first halting the FREQUENCY COUNTER and then entering the DSKY display routine. The DSKY displays (registers 2 and 3) are read as one number, 163, 830 This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

76. Set the T12 COUNTER STOP switch to the ON position.

77. Transfer Control to Location 1303 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

78. Press the MONITOR indicator switch to the on (illuminated) position.

79. Press the CL Key.

80. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

81. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

82. Press the PROCEED button.

83. Verify the following events:

a. DSKY Register 1 displays a 2 in position 3.

b. The FREQUENCY COUNTER IS counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

84. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

85. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

86. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST7, 8, and 9 - PROGRAM ANALYSIS

TTEST7 measures the time required to increment the TIME 3 Counter from 1, through full scale, and back to zero. TTEST8 measures the time required to increment the TIME 4 Counter from 1, through fully scale, and back to zero. TTEST9 measures the time required to increment the TIME 5 Counter from 1, through full scale, and back to zero. When performing these combined tests the operational sequence starts with Time Test 7 (location 1332), and after the results are displayed the program is continued by a manual Transfer of Control to location 1354 (Time Test 8). After obtaining the results of this test, the program is continued by another manual Transfer of Control to location 1357 for Time Test 9.

All three tests utilize a common routine which clears the DSKY display, starts the external counter after 1 is detected in the TIME Counter being tested, stops the external counter after zero is detected in the TIME Counter under test, and displays the specified elapsed time in DSKY Registers 2 and 3. The common routine is tied into each test by initialization procedures which set the Index location to a value that will produce the proper counter address according to the Time Test being performed. The programmed functions of the common routine are executed in the order described below.

a. Clears the DSKY Registers and displays the test number in position 3 of DSKY Register 1. (Displays 3 for TTEST7, 4 for TTEST8, and 5 for TTEST9.)

b. Deposits positive zero into the TIME Counter under test.

c. Starts the external clock (FREQUENCY COUNTER) immediately after the TIME Counter increments to a count of 1.

d. Enters a sample loop through the TIME Counter location, and looks for a positive zero condition in the TIME Counter.

e. When the TIME Counter reaches positive zero, the program halts the external clock, and enters the DSKY display routine. The DSKY displays (Register 2 and 3) are read as one number 163, 830. This number will be displayed at the end of each Time Test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

87. Set the T12 COUNTER STOP switch to the ON position.

88. Transfer Control to Location 1332 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

89. Press the MONITOR indicator switch to the on (illuminated) position.

90. Press the CL Key.

91. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

92. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

93. Press the PROCEED button.

94. Verify the following events:

a. DSKY Register 1 displays a 3 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

95. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

96. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

97. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

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98. Set the T12 COUNTER STOP switch to the ON position.

99. Transfer Control to Location 1354 using the procesures of JDC 05412 (Transfer Control Operating Procedure).

100. Press the MONITOR indicator switch to the on (illuminated) position.

101. Press the CL Key.

102. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

103. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

104. Press the PROCEED button.

105. Verify the following events:

a. DSKY Register 1 displays a 4 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

106. Verify the the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

107. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

108. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

109. Set the T12 COUNTER STOP switch to the ON position.

110. Transfer Control to Location 1357 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

111. Press the MONITOR indicator switch to the on (illuminated) position.

112. Press the CL Key.

113. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

114. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

115. Press the PROCEED button.

116. Verify the following events:

a. DSKY Register 1 displays a 5 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

117. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

118. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

119. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST10 AND 11 - PROGRAM ANALYSIS

TTEST10 measures the time required to decrement the TIME 6 Counter from positive full scale to minus zero. TTEST11 measures the time required to decrement the TIME 6 Counter from full scale to minus zero. The elapsed time measured should result in 10.23906 seconds in both tests. Both tests utilize a common routine to clear the DSKY display, set the TIME 3 Counter set Bit 16 of Channel 13, start the external counter, monitor TIME 6 for a minus zero, and stop the external counter. When performing these tests, the operational sequence starts with Time Test 10 (location 3, 1400) and stops when the results are displayed in DSKY Registers 2 and 3. The operator continues the program by Transferring Control to Time Test 11 (location 3, 1431). The program also stops on this test when the results are displayed in DSKY Registers 2 and 3. Between the two tests only the initialization procedures are different. During the initialization of Time Test 10, the TIME 6 counter is loaded with a positive full scale number. During the initialization of Time Test 11, the TIME 6 counter is loaded with a negative full scale number. The programmed functions of the routine common to both tests are executed in the order described below.

a. Deposits number (Positive Full Scale for TTEST10 and Negative Full Scale for TTEST11) into the TIME 6 Counter (location 0031).

b. Clears the DSKY Registers and displays the number 6 in position 3 of DSKY Register 1.

c. Sets a Positive Full Scale number into the TIME 3 Counter and CCS loops TIME 3 sampling for an increment back to zero.

d. After TIME 3 increments to zero, the program sets the Enable T6 Rupt (Bit 15, Channel 13) and starts the external counter (FREQUENCY COUNTER).

e. Enters a CCS loop through the TIME Counter location sampling for a minus zero.

f. Stops the external counter immediately after TIME 6 switches to minus zero and displays the number 10239 in DSKY Register 2 and 06000 in DSKY Register 3. This number will be displayed at the end of each test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement with ± 2 counts in the least significant counter position.

120. Set the FREQUENCY COUNTER FREQ-TIME switch to the third MS position. Verify that the decimal point is positioned between the second and third least significant counter digits, i.e., 00000.00.

121. Set the T12 COUNTER STOP switch to the ON position.

122. Transfer Control to E Bank 3, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

123. Press the MONITOR indicator switch to the on (illuminated) position.

124. Press the CL Key.

125. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

126. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

127. Press the PROCEED button.

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128. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

129. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

130. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

131. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 10239.06 milliseconds within ± 2 counts in the least significant counter position. Stamp data sheet.

132. Set the T12 COUNTER STOP switch to the ON position.

133. Transfer Control to E Bank 3, location 1431 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

134. Press the MONITOR indicator switch to the on (illuminated) position.

135. Press the CL Key.

136. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

137. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

138. Press the PROCEED button.

139. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

140. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

141. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

142. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count 10239.06 within ± 2 counts in the least significant counter position. Stamp data sheet.

TTEST12 - PROGRAM ANALYSIS

TTEST12 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 4. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-4 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 4 switches to zero and displays the number 07500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

143. Set the FREQUENCY COUNTER FREQ-TIME switch to the first μs position.

144. Set the T12 COUNTER STOP switch to the ON position.

145. Transfer Control to E Bank 3, location 1433 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

146. Press the MONITOR indicator switch to the on (illuminated) position.

147. Press the CL Key.

148. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

149. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

150. Press the PROCEED button.

151. Verify the following events:

a. DSKY Register 1 displays 3-4 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

152. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

153. Verify that DSKY Register 2 displays 07500 with 00000 in DSKY Register 3. Stamp data sheet.

154. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 7500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST13 - PROGRAM ANALYSIS

TTEST13 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 5. The programmed functions of the test routine are in the order described below.

a. Clears the DSKY display and displays 3-5 in DSKY Register 1 positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 5 Counter and enters a CCS loop through the TIME 5 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 5 switches to zero and displays the number 05000 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

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155. Set the T12 COUNTER STOP switch to the ON position.

156. Transfer Control to E Bank 3, location 1454 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

157. Press the MONITOR indicator switch to the on (illuminated) position.

158. Press the CL Key.

159. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

160. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

161. Press the PROCEED button.

162. Verify the following events:

a. DSKY Register 1 displays 3-5 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

163. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

164. Verify that DSKY Register 2 displays 05000 with 00000 in DSKY Register 3. Stamp data sheet.

165. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 5000 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST14 - PROGRAM ANALYSIS

TTEST14 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 1. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-1 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 1 Counter and enters a CCS loop through the TIME 1 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 1 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

166. Set the T12 COUNTER STOP switch to the ON position.

167. Transfer Control to E Bank 3, location 1474 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

168. Press the MONITOR indicator switch to the on (illuminated) position.

169. Press the CL Key.

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170. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

171. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

172. Press the PROCEED button.

173. Verify the following events:

a. DSKY Register 1 displays 4-1 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

174. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

175. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

176. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST15 - PROGRAM ANALYSIS

TTEST15 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 2. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-2 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 2 Counter and enters a CCS loop through the TIME 2 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 2 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

177. Set the T12 COUNTER STOP switch to the ON position.

178. Transfer Control to E Bank 3, location 1515 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

179. Press the MONITOR indicator switch to the on (illuminated) position.

180. Press the CL Key.

181. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

182. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

183. Press the PROCEED button.

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184. Verify the following events:

a. DSKY Register 1 display 4-2 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

185. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

186. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

187. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST16 - PROGRAM ANALYSIS

TTEST16 measures the time elapse (phase) between the incrementing of TIME 3 and TIME 6. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-6 in DSKY Register 1, positions 2 through 4.

b. Deposits a Negative Full Scale number into the TIME 6 Counter and enables the T6 Rupt (Bit 16 of Channel 13).

c. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

d. After TIME 3 changes to zero, the program starts the external counter (FREQUENCY COUNTER) and inserts a 1 into the TIME 6 Counter.

e. Samples the TIME 6 Counter for a negative zero condition, and after detecting this condition, stops the external counter.

f. Displays the number 03125 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

188. Set the T12 COUNTER STOP switch to the ON position.

189. Transfer Control to E Bank 3, location 1537 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

190. Press the MONITOR indicator switch to the on (illuminated) position.

191. Press the CL Key.

192. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

193. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

194. Press the PROCEED button.

195. Verify the following events:

a. DSKY Register 1 displays 3-6 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

196. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

197. Verify that DSKY Register 2 displays 03125 with 00000 in DSKY Register 3. Stamp data sheet.

198. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 312.5 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

WARNING TEST (WTEST) - PROGRAM ANALYSIS

The purpose of this test is to check the Warning Alarm. Upon entering the test, the state of the Warning Alarm is examined. If the Warning Alarm has been set the program will energize the Computer Activity (COMP ACTY) indicator on the DSKY. A Warning Alarm condition will also illuminate the AGC ALARMS indicator 9 on the LOGIC DRAWER NO. 1 panel of the CTS. The program then provides a 15 second delay during which, the Warning Light should be extinguished (if illuminated). If the Warning Light is still on at the end of this period, the program will enter the STOP Fail routine and the test will be terminated. If the preliminary check was successful, eight additional checks will be performed. Failure of anyone of these checks is indicated in the form of a (15 second) display in DSKY Register 1 without terminating the test. A failure indication is characterized by a 9-displayed in positions 2 and 3 followed by the check number in position 4. (For example if Check #1 fails, Register 1 will display 9-1.)

After the failure indication has been displayed for 15 seconds the program will continue on to the next check. The eight checks employ the same philosophy. Each is concerned with pulsing the test alarm bit every "Y" seconds over a period of "Z" seconds. The state of the warning bit is examined at the end of the "Z" seconds and, if it is not what is expected, there is a 15 second fail display.

Each time the Test Alarm bit is pulsed (i.e., every "Y" seconds during a check), the state of the warning bit is checked. The COMP ACTY indicator on the DSKY is then used to indicate the condition of the warning bit. If the warning bit is on the COMP ACTY indicator will be turned on. If the warning bit is off the COMP ACTY indicator will be extinguished.

During the performance of a particular check, the DSKY will display the following:

R1 = 8- "test #(1-8)"

R2 = "Y" - how often the test alarm bit is being pulsed (shown in seconds and hundredths of seconds)

R3 = "Z" - length of time over which the alarm bit is pulsed (in seconds).

At the end of the check, R2 and R3 are blanked and, if success, 8-"test #" remains in R1. Otherwise R1 becomes 9- "test #".

The specifications for each check are shown in table 1.

Table 1. Alarm Test Specifications

Check No.	R1 Display	R2 (Y)*	R3 (Z)	Initial Warning State	End Expected Warning State
1	8-1	3.00	60	OFF	OFF
2	8-2	2.00	60	OFF	OFF or ON accepted
3	8-3	1.00	12	OFF	ON
4	8-4	0.16	1	OFF	ON
5	8-5	0.50	60	ON	ON
6	8-6	1.00	60	ON	ON
7	8-7	2.00	60	ON	OFF or ON accepted
8	8-8	3.00	60	ON	OFF

*(1 pulse every Y.YY secs. for ZZ seconds)

199. Set the T12 COUNTER STOP switch to the ON position.

200. Transfer Control to E Bank 4, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

201. Press the MONITOR indicator switch to the on (illuminated) position.

202. Press the CL Key.

203. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

204. Press the PROCEED button.

205. Verify that the DSKY COMP ACTY indicator is illuminated and DSKY Register 1 displays 8-1.

206. Verify that the DSKY COMP ACTY indicator is extinguished and the DSKY Registers display the following:

Register	Display
1	8-1
2	00300
3	00060

207. Verify that DSKY Registers 2 and 3 are blanked and 8-1 remains in DSKY Register 1. Stamp data sheet.

NOTE: Several checks to follow have extremely short DSKY display times. It is suggested that verification of these checks be initially recorded by a check mark on the JDC sheet itself. The data sheet is then stamped immediately on the conclusion of the WARNING test.

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208. Verify that the DSKY Registers display the following:

Register	Display
1	8-2
2	00200
3	00060

209. Verify that the DSKY COMP ACTY indicator is illuminated but extinguishes in less than a minute.

210. Verify that DSKY Registers 2 and 3 are blanked with 8-2 still in DSKY Register 1. Stamp data sheet.

211. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-3
2	00100
3	00012

212. Verify that DSKY Registers 2 and 3 are blanked, the COMP ACTY indicator is extinguished, and DSKY Register 1 still displays 8-3. Stamp data sheet.

213. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-4
2	00016
3	00001

Stamp data sheet.

214. Verify that the DSKY Registers display the following:

Register	Display
1	8-5
2	00050
3	00060

215. Verify that the DSKY COMP ACTY indicator is illuminated.

216. Verify that the DSKY Registers 2 and 3 are blanked, the DSKY COMP ACTY indicator is still illuminated, and DSKY Register 1 still displays 8-5. Stamp data sheet.

217. Verify that the DSKY Register 1 is blanked and the COMP ACTY indicator is extinguished.

218. Verify that the DSKY Registers display the following:

Register	Display
1	8-6
2	00100
3	00060

219. Verify that the COMP ACTY indicator is illuminated.

220. Verify that DSKY Registers 2 and 3 are blanked with the COMP ACTY indicator still illuminated and 8-6 is still displayed in Register 1. Stamp data sheet.

221. Verify that the COMP ACTY indicator is extinguished and the DSKY Registers now display the following:

Register	Display
1	8-7
2	00200
3	00060

---

222. Verify that the COMP ACTY indicator illuminates.

223. Verify that DSKY Registers 2 and 3 are blanked with 8-7 still displayed in DSKY Register 1. Stamp data sheet.

224. Verify that the COMP ACTY indicator extinguishes.

225. Verify that DSKY Register 1 flashes 8-7 once.

226. Verify that the DSKY Registers now display the following:

Register	Display
1	8-8
2	00300
3	00060

227. Verify that the DSKY Registers 2 and 3 are blanked with 8-8 still displayed in Register 1.

228. Verify that DSKY Registers now display the following success indication.

Register	Display
1	8-8
2	99999
3	99999

Stamp data sheet.

229. A failure indication of any one of the eight checks will be displayed in DSKY Register 1 at the end of that particular check. The failure display will be an 8-9 presented in positions 2 through 4 of Register 1. In the event a failure occurs rerun the test by performing steps 199 through 204 again. If the failure reoccurs discontinue further testing.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 8

JDC
NO. 05773
REV. D
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ ______ CAL DATE
NAME ______ SER. NO. ______ ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
18.	TTEST4 - Ready for Standby	FREQUENCY COUNTER is counting. DSKY Register 1 is 24-4. DSKY Register 2 and 3 are blank.	
21.	TTEST4 - Amount of time spent in Standby	Computer operated in the Standby mode for a period of	
22.	TTEST4 - Out of Standby	DSKY STBY indicator extinguishes. DSKY PRO (STBY) Key depressed NMT three times.	
28.	TTEST4 - Measurement	FREQUENCY COUNTER totals	
29.	TTEST4 - DSKY Display - Calculations	Registers 2 and 3 displays DSKY NUM/32	
31.	TTEST4 - Evaluation	The data recorded in step 28 agrees with the results of the Calculation of step 29 within ± 0.2 milliseconds.	
39.	TTEST1 - Start Check	DSKY Register 1 is 24-1, FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	

DATE 26 JAN 67

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 8

JDC
NO. 05773
REV. D

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
40.	TTEST1 - Measurement	FREQUENCY COUNTER totals	
41.	TTEST1 - DSKY Displays	5120	
42.	TTEST1 - Evaluation	Results in steps 40 and 41 are within ±2 counts in the least significant counter position.	
50.	TTEST2 - Start Check	DSKY Register 1 is 24-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
51.	TTEST2 - Measurement	FREQUENCY COUNTER totals	
52.	TTEST2 - DSKY Displays	00010	
53.	TTEST2 - Evaluation	Results in steps 51 and 52 are within ±2 counts in the least significant counter position.	
61.	TTEST3 - Start Check	DSKY Register 1 is 24-3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
62.	TTEST3 - Measurement	FREQUENCY COUNTER totals	
63.	TTEST3 - DSKY Displays	5120	
64.	TTEST3 - Evaluation	Results in steps 62 and 63 are within ±2 counts in the least significant counter position.	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 8

JDC
NO. 05773
REV. D

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
72.	TTEST5 - Start Check	DSKY Register 1 is 1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
73.	TTEST5 - Measurement	FREQUENCY COUNTER totals	
74.	TTEST5 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
75.	TTEST5 - Evaluation	Results in steps 73 and 74 are within ±2 counts in the least significant counter position.	
83.	TTEST6 - Start Check	DSKY Register 1 is 2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
84.	TTEST6 - Measurement	FREQUENCY COUNTER totals	
85.	TTEST6 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
86.	TTEST6 - Evaluation	Results in steps 84 and 85 are within ± 2 counts in the least significant counter position.	
94.	TTEST7 - Start Check	DSKY Register 1 is 3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
95.	TTEST7 - Measurement	FREQUENCY COUNTER totals	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 8

JDC
NO. 05773
REV. D

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
96.	TTEST7 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
97.	TTEST7 - Evaluation	Results in steps 95 and 96 are within ±2 counts in the least significant counter position.	
105.	TTEST8 - Start Check	DSKY Register 1 is 4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
106.	TTEST8 - Measurement	FREQUENCY COUNTER totals	
107.	TTEST8 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
108.	TTEST8 - Evaluation	Results in steps 106 and 107 are within ±2 counts in the least significant counter position.	
116.	TTEST9 - Start Check	DSKY Register 1 is 5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
117.	TTEST9 - Measurement	FREQUENCY COUNTER totals	
118.	TTEST9 - DSKY Displays	Reg. 2 = 16383, Reg. 3 - 00000	
119.	TTEST9 - Evaluation	Results in steps 117 and 118 are within ±2 counts in the least significant counter position.	

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JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
128.	TTEST10 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
129.	TTEST10 - Measurement	FREQUENCY COUNTER totals	
130.	TTEST10 - DSKY Displays	Reg. 2 = 10239, Reg. 3 - 06000	
131.	TTEST10 - Evaluation	Results in steps 129 and 130 are within ±2 counts in the least significant counter position.	
139.	TTEST11 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
140.	TTEST11 - Measurement	FREQUENCY COUNTER totals	
141.	TTEST11 - DSKY Displays	Reg. 2 = 10239, Reg. 3 = 06000	
142.	TTEST11 - Evaluation	Results in steps 140 and 141 are within ±2 counts in the least significant counter position.	
151.	TTEST12 - Start Check	DSKY Register 1 is 3-4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
152.	TTEST12 - Measurement	FREQUENCY COUNTER totals	

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Step	Parameter	Specification	Results
153.	TTEST12 - DSKY Displays	Reg. 2 = 07500, Reg. 3 = 00000	
154.	TTEST12 - Evaluation	Results in steps 152 and 153 are within ±2 counts in the least significant counter position.	
162.	TTEST13 - Start Check	DSKY Register 1 is 3-5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
163.	TTEST13 - Measurement	FREQUENCY COUNTER totals	
164.	TTEST13 - DSKY Displays	Reg. 2 = 05000, Reg. 3 = 00000	
165.	TTEST13 - Evaluation	Results in steps 163 and 164 are within ±2 counts in the least significant counter position.	
173.	TTEST14 - Start Check	DSKY Register 1 is 4-1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
174.	TTEST14 - Measurement	FREQUENCY COUNTER totals	
175.	TTEST14 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
176.	TTEST14 - Evaluation	Results in steps 174 and 175 are within ±2 counts in the least significant counter position.	

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Step	Parameter	Specification	Results
184.	TTEST15 - Start Check	DSKY Register 1 is 4-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
185.	TTEST15 - Measurement	FREQUENCY COUNTER totals	
186.	TTEST15 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
187.	TTEST15 - Evaluation	Results in steps 185 and 186 are within ±2 counts in the least significant counter position.	
195.	TTEST16 - Start Check	DSKY Register 1 is 3-6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
196.	TTEST16 - Measurement	FREQUENCY COUNTER totals	
197.	TTEST16 - DSKY Displays	Reg. 2 = 03125, Reg. 3 = 00000	
198.	TTEST16 - Evaluation	Results in steps 196 and 197 are within ±2 counts in the least significant counter position.	
207.	WTEST Check No. 1	DSKY Register 1 is 8-1. DSKY Registers 2 and 3 are blank.	
210.	WTEST Check No. 2	DSKY Register 1 is 8-2 and Flashes twice. DSKY Registers 2 and 3 are blank.	

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Step	Parameter	Specification	Results
212.	WTEST Check No. 3	DSKY Register 1 is 8-3. DSKY Registers 2 and 3 are blank.	
213.	WTEST Check No. 4	DSKY Register 1 is 8-4. DSKY Registers 2 and 3 are 00016 and 00001 respectively.	
216.	WTEST Check No. 5	DSKY Register 1 is 8-5. DSKY Registers 2 and 3 are blank.	
220.	WTEST Check No. 6	DSKY Register 1 is 8-6. DSKY Registers 2 and 3 are blank. DSKY COMP ACTY is on.	
223.	WTEST Check No. 7	DSKY Register 1 is 8-7. DSKY Registers 2 and 3 are blank.	
228.	WTEST8 and Success Display	DSKY Register 1 is 8-8. DSKY Register 2 is 99999. DSKY Register 3 is 99999.	

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OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

JDC 05773 REV. E PAGE 1 OF 20
INITIAL TDRR 32809 D.S. PGS 8

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION Tests the outputs of both the High-order (Channel 3) and Low-order (Channel 4) scalers, along with Time Counters T2 through T6. E Memory retention in the Standby mode is checked during the scaler test. The last section of this test checks the operation of the warning alarm. A brief analysis is included as a preface to each specific test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	4-20-67	33626	1	-	EA	-
B	10-12-67	34824	2,4-16,18,20	8	EA	-
C	10-20-67	34887	1, 11-16, 18	-	EA	-
D	3-29-68	35992	1,2,4	1	EA	-
E	10-17-68	36906	4	-	EA	-

REFERENCES JDC's 05406, 05407, 05412, 05413, 05414, 05403
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program TIME AND WARNING CHECKS Mylar Tape, JDC 05774

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the FREQUENCY COUNTER.

3. On the XY Interface Panel:

a. Set the CHANNEL T switches to position 211.

b. Set the FREQ + PHASE switch to the FRT T →S position.

4. Prepare the CTS FREQUENCY COUNTER for operation as specified by JDC 05403, and verify that coaxial cables are present and connected as follows:

XY Interface Panel	to	A20 Panel
CNTR-A jack		CNTR A jack
Frequency Counter	to	A20 Panel
FREQ A - DC jack		CNTR A jack

5. On the FREQUENCY COUNTER set:
FUNCTION switch to PERIOD A
FREQ-TIME switch to μS.
DISPLAY control to ∞.
TRIGGER LEVEL vernier for display of 312.5 ±1.0.

6. Set CHANNEL T switches to position 212, and set the FREQUENCY COUNTER FUNCTION switch to the PERIOD A position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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7. Set the FREQ - TIME switch to the MS scale-center position. Verify that the Display decimal point is located between the first and second least significant digits, i. e., 000000.0. Set the DISPLAY Control to the maximum clockwise position.

8. Load Program TIME AND WARNING CHECKS (JDC 05774) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

9. Rewind tape and verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).

10. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

TTEST4-PROGRAM ANALYSIS Loads E BANKS with CHECKERS. The external (FREQUENCY COUNTER) clock is triggered and Channels 3 and 4 are stored in location 0065 and 0066. The computer then waits for the operator to switch to Standby. After Standby an operator TC to 0373 will resume the program, storing the updated scaler count in locations 67 and 70, stopping the external Counter, and performing a CHECK SUM of E Memory CHECKERS. If the CHECKSUM is correct, program will subtract 0065 from 0067 and 0066 from 0070 and display the total difference in DSKY Register 2 and 3. In order to convert the DSKY count to milliseconds the operator must divide it by 32 out to 7 places. The quotient is then compared with the count displayed on the Frequency counter to verify scaler continuity during standby.

11. Transfer Control to Location 0250 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

12. Press the MONITOR indicator switch to the on (illuminated) position.

13. Press the CL Key.

14. Press the RESET button on the FREQUENCY COUNTER and Verify the display is zeroed.

15. Set the T12 COUNTER STOP switch to the OFF position.

16. Set the INHIBIT INCREMENTS switch to the OFF position.

17. Press the PROCEED button.

18. Let the computer run for approximately 10 seconds. Verify the conditions listed below are present by stamping data sheet.

a. FREQUENCY COUNTER is counting.

b. DSKY Register 1 displays 24-4.

c. DSKY Registers 2 and 3 are blank.

19. Hold down the DSKY PRO (STBY) Key until the STBY indicator illuminates and time the interval. (Indicator should illuminate within 2.00 seconds after the PRO (STBY) Key has been depressed.)

20. Set the T12 COUNTER STOP switch to the ON position.

21. Allow the computer to remain in the Standby mode for period longer than 3 minutes but less than 15 minutes. Record the amount of time spent in the Standby mode on the data sheet.

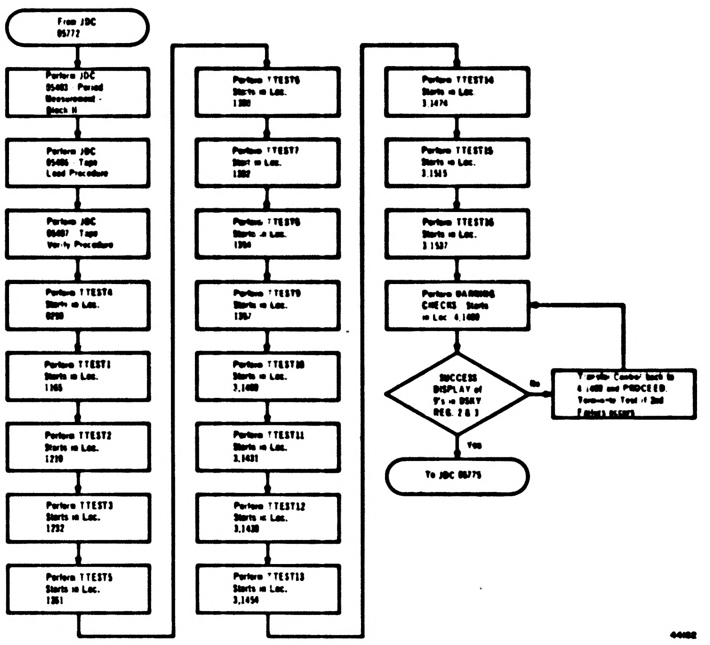
From JDC 05772
Perform JDC 05403 Period Measurement - Block II
Perform JDC 05406 Tape Load Procedure
Perform JDC 05407 Tape Verify Procedure
Perform TTEST4 Starts in Loc. 0250
Perform TTEST1 Starts in Loc. 1165
Perform TTEST2 Starts in Loc. 1210
Perform TTEST3 Starts in Loc. 1232
Perform TTEST5 Starts in Loc. 1261
Perform TTEST6 Starts in Loc. 1300
Perform TTEST7 Start in Loc. 1302
Perform TTEST8 Starts in Loc. 1304
Perform TTEST9 Starts in Loc. 1307
Perform TTEST10 Starts in Loc. 3,1400
Perform TTEST11 Starts in Loc. 3,1431
Perform TTEST12 Starts in Loc. 3,1430
Perform TTEST13 Starts in Loc. 3,1454
Perform TTEST14 Starts in Loc. 3,1474
Perform TTEST15 Starts in Loc. 3,1515
Perform TTEST16 Starts in Loc. 3,1537
Perform WARNING CHECKS Starts in Loc 4,1400
SUCCESS DISPLAY of 9's in DSKY REG. 2 & 3
No
Transfer Control back to 4,1400 and PROCEED. Terminate Test if 2nd Failure occurs
Yes
To JDC 05775

Figure 1. Flowchart for Performing Program TIME AND WARNING CHECKS

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22. Depress and hold the DSKY PRO (STBY) Key for a minimum of three seconds or until the STBY indicator extinguishes, whichever occurs first. If STBY does not extinguish, release and depress again, up to a maximum of three times (RESTART may illuminate). Record on Data Sheet, number of times DSKY PRO (STBY) Key was depressed.

A. On the CTS:
Depress FRESH START
Depress PROCEED
Depress ALARM RESET
B. Depress RSET KEY on DSKY.

23. Transfer Control to Location 0373 using the procedures of JDC 05412.

24. Press the MONITOR indicator switch to the on (illuminated) position.

25. Press the CL Key.

26. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

27. Press the PROCEED button.

28. Verify that the FREQUENCY COUNTER stops counting and immediately record total count.

29. Verify that DSKY Registers 2 and 3 display a number (with a minimum of eight digits total). Record the number on the data sheet. Also divide the DSKY number by 32 and record results on the data sheet.

30. If the DSKY displays all 9's in Registers 2 and 3 the computer has failed the CHECKER BOARD CHECKSUM portion of this test. Proceed to step 7 of this procedure and perform all successive steps again. If the test fails again discontinue further testing.

31. Compare results of steps 28 and 29. Stamp data sheet.

TTEST1 - PROGRAM ANALYSIS

This test segment checks the time required for Channel 4 to count from zero, to full scale. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-1 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER.) The program then re-enters the same Channel 4 full scale check subroutine described above. Immediately after Channel 4 increments through zero again, the program retriggers the external clock, halts the time counter, and sets up the number 5120 in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement with ± 2 counts in the least significant position.

32. Set the T12 COUNTER STOP switch to the ON position.

33. Transfer Control to Location 1165 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

34. Press the MONITOR indicator switch to the on (illuminated) position.

35. Press the CL Key.

36. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

37. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

38. Press the PROCEED button.

39. Verify the following events:

a. DSKY Register 1 displays 24-1.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

40. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

41. Verify that the DSKY Register 2 Displays 5120. Stamp data sheet.

42. Verify that the number displayed on the FREQUENCY COUNTER equals the DSKY number 5120 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST2 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 4 to count from zero to 32. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-2 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). The program then reenters the same Channel 4 full scale check subroutine described above, except that an octal 37 is used for a constant in place of the full scale constant. (Octal 37 is equal to decimal 31.) Immediately after Channel 4 reaches the 32nd count, the program retriggers the external clock, halts the time counter, and sets up the number 10 (00010) in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (00010) by the DSKY and verifying agreement within ±2 counts in the least significant position.

43. Set the T12 COUNTER STOP switch to the ON position.

44. Transfer Control to Location 1210 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

45. Press the MONITOR indicator switch to the on (illuminated) position.

46. Press the CL Key.

47. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

48. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

49. Press the PROCEED button.

50. Verify the following events:

a. DSKY Register 1 displays 24-2.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

51. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

52. Verify that the DSKY Register 2 displays 00010. Stamp data sheet.

53. Verify the number displayed on the FREQUENCY COUNTER equals the DSKY number (00010) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST3 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 3 to increment once. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-3 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). After activating the FREQUENCY COUNTER the program sets up the number 5120 in DSKY display Register 2. The program then stores the contents of Channel 3 into Register L and enters a negative 1 into location 0075 to be indexed later. The program enters a subroutine monitoring the state of Channel 3. This subroutine is similar to the one described above except that the RXOR instruction is transformed to RXOR Channel 3 (instead of 4) by the -1 in the Index location. As soon as a difference is detected in the value of Channel 3 (caused by an increment pulse) the program will retrigger the external clock halting the time measurement. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement within ±2 counts in the least significant position.

54. Set the T12 COUNTER STOP switch to the ON position.

55. Transfer Control to Location 1232 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

56. Press the MONITOR indicator switch to the on (illuminated) position.

57. Press the CL Key.

58. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

59. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

60. Press the PROCEED button.

61. Verify the following events:

a. DSKY Register 1 displays 24-3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

62. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

63. Verify that the DSKY Register 2 displays 5120. Stamp data sheet.

64. Verify that the number displayed on the number (5120) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST5 - PROGRAM ANALYSIS

The program routines comprising Time Test 5 are designed to measure the time required for the TIME 1 Counter to count from 1, through full scale, and back to zero. The TTEST5 programmed test functions and executed in the order listed below.

a. Clears the DSKY Registers and displays the number 1 in position 3 of DSKY Register 1.

b. Deposits zeros in location 0025 (TIME 1 Counter) and sample loops 0025 for the first count (or a count of 1).

c. Detecting a count of 1, the program will switch to a subroutine to start the external clock (FREQUENCY COUNTER). After starting the external clock the program returns to a sample loop, this time testing for a positive zero condition in 0025.

d. Detecting that 0025 is positive zero, the program switches to a subroutine to stop the external clock. The program then enters a display routine which places the number 16383 in DSKY Register 2, and 00000 in DSKY Register 3. The DSKY displays (Registers 2 and 3) are read as one number, 163,830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

65. Set the T12 COUNTER STOP switch to the ON position.

66. Transfer Control to Location 1261 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

67. Press the MONITOR indicator switch to the on (illuminated) position.

68. Press the CL Key.

69. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

70. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

71. Press the PROCEED button.

72. Verify the following events:

a. DSKY Register 1 displays a 1 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

73. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

74. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

75. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST6 - PROGRAM ANALYSIS

The program routines comprising Time Test 6 are designed to measure the time required for the TIME2 Counter to count from 1, through full scale, and back to zero. The TTEST6 programmed test functions are executed in the order described below.

a. Clears the DSKY Registers and displays the number 2 in position 3 of DSKY Register 1.

b. Starts the external clock (FREQUENCY COUNTER) immediately after the next transition of the TIME 1 counter.

c. Deposits a count of 1 into the TIME 2 Counter.

d. Deposits a positive full scale (37777) number into the TIME 1 counter.

e. Enters a sample loop through TIME 1, waiting for the TIME 1 Counter to increment from full scale to zero. This transition indicates that the TIME 2 Counter has been incremented.

f. When the TIME 1 Counter switches to zero, the program will check the TIME 2 Counter for a positive zero condition. If positive zero is not present in the TIME 2 Counter, the program will form a jump loop cycling through the functions described in d and e above, until such time as the TIME 2 Counter is finally incremented back to zero.

g. When a positive zero condition is detected (approximately 163,830 milliseconds later) in the TIME 2 Counter, the program will continue on, first halting the FREQUENCY COUNTER and then entering the DSKY display routine. The DSKY displays (registers 2 and 3) are read as one number, 163,830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

76. Set the T12 COUNTER STOP switch to the ON position.

77. Transfer Control to Location 1303 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

78. Press the MONITOR indicator switch to the on (illuminated) position.

79. Press the CL Key.

80. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

81. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

82. Press the PROCEED button.

83. Verify the following events:

a. DSKY Register 1 displays a 2 in position 3.

b. The FREQUENCY COUNTER IS counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

84. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

85. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

86. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST7, 8, and 9 - PROGRAM ANALYSIS

TTEST7 measures the time required to increment the TIME 3 Counter from 1, through full scale, and back to zero. TTEST8 measures the time required to increment the TIME 4 Counter from 1, through fully scale, and back to zero. TTEST9 measures the time required to increment the TIME 5 Counter from 1, through full scale, and back to zero. When performing these combined tests the operational sequence starts with Time Test 7 (location 1332), and after the results are displayed the program is continued by a manual Transfer of Control to location 1354 (Time Test 8). After obtaining the results of this test, the program is continued by another manual Transfer of Control to location 1357 for Time Test 9.

All three tests utilize a common routine which clears the DSKY display, starts the external counter after 1 is detected in the TIME Counter being tested, stops the external counter after zero is detected in the TIME Counter under test, and displays the specified elapsed time in DSKY Registers 2 and 3. The common routine is tied into each test by initialization procedures which set the index location to a value that will produce the proper counter address according to the Time Test being performed. The programmed functions of the common routine are executed in the order described below.

a. Clears the DSKY Registers and displays the test number in position 3 of DSKY Register 1. (Displays 3 for TTEST7, 4 for TTEST8, and 5 for TTEST9.)

b. Deposits positive zero into the TIME Counter under test.

c. Starts the external clock (FREQUENCY COUNTER) immediately after the TIME Counter increments to a count of 1.

d. Enters a sample loop through the TIME Counter location, and looks for a positive zero condition in the TIME Counter.

e. When the TIME Counter reaches positive zero, the program halts the external clock, and enters the DSKY display routine. The DSKY displays (Register 2 and 3) are read as one number 163,830. This number will be displayed at the end of each Time Test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

87. Set the T12 COUNTER STOP switch to the ON position.

88. Transfer Control to Location 1332 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

89. Press the MONITOR indicator switch to the on (illuminated) position.

90. Press the CL Key.

91. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

92. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

93. Press the PROCEED button.

94. Verify the following events:

a. DSKY Register 1 displays a 3 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank

Stamp data sheet.

95. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

96. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

97. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

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98. Set the T12 COUNTER STOP switch to the ON position.

99. Transfer Control to Location 1354 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

100. Press the MONITOR indicator switch to the on (illuminated) position.

101. Press the CL Key.

102. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

103. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

104. Press the PROCEED button.

105. Verify the following events:

a. DSKY Register 1 displays a 4 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

106. Verify the the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

107. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

108. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

109. Set the T12 COUNTER STOP switch to the ON position.

110. Transfer Control to Location 1357 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

111. Press the MONITOR indicator switch to the on (illuminated) position.

112. Press the CL Key.

113. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

114. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

115. Press the PROCEED button.

116. Verify the following events:

a. DSKY Register 1 displays a 5 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

117. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

118. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

119. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST10 AND 11 - PROGRAM ANALYSIS

TTEST10 measures the time required to decrement the TIME 6 Counter from positive full scale to minus zero. TTEST11 measures the time required to decrement the TIME 6 Counter from full scale to minus zero. The elapsed time measured should result in 10.23906 seconds in both tests. Both tests utilize a common routine to clear the DSKY display, set the TIME 3 Counter set Bit 16 of Channel 13, start the external counter, monitor TIME 6 for a minus zero, and stop the external counter. When performing these tests, the operational sequence starts with Time Test 10 (location 3,1400) and stops when the results are displayed in DSKY Registers 2 and 3. The operator continues the program by Transferring Control to Time Test 11 (location 3,1431). The program also stops on this test when the results are displayed in DSKY Registers 2 and 3. Between the two tests only the initialization procedures are different. During the initialization of Time Test 10, the TIME 6 counter is loaded with a positive full scale number. During the initialization of Time Test 11, the TIME 6 counter is loaded with a negative full scale number. The programmed functions of the routine common to both tests are executed in the order described below.

a. Deposits number (Positive Full Scale for TTEST10 and Negative Full Scale for TTEST11) into the TIME 6 Counter (location 0031).

b. Clears the DSKY Registers and displays the number 6 in position 3 of DSKY Register 1.

c. Sets a Positive Full Scale number into the TIME 3 Counter and CCS loops TIME 3 sampling for an increment back to zero.

d. After TIME 3 increments to zero, the program sets the Enable T6 Rupt (Bit 15, Channel 13) and starts the external counter (FREQUENCY COUNTER).

e. Enters a CCS loop through the TIME Counter location sampling for a minus zero.

f. Stops the external counter immediately after TIME 6 switches to minus zero and displays the number 10239 in DSKY Register 2 and 06000 in DSKY Register 3. This number will be displayed at the end of each test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement with ± 2 counts in the least significant counter position.

120. Set the FREQUENCY COUNTER FREQ-TIME switch to the third MS position. Verify that the decimal point is positioned between the second and third least significant counter digits, i.e., 00000.00.

121. Set the T12 COUNTER STOP switch to the ON position.

122. Transfer Control to E Bank 3, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

123. Press the MONITOR indicator switch to the on (illuminated) position.

124. Press the CL Key.

125. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

126. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

127. Press the PROCEED button.

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128. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

129. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

130. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

131. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 10239.06 milliseconds within ± 2 counts in the least significant counter position. Stamp data sheet.

132. Set the T12 COUNTER STOP switch to the ON position.

133. Transfer Control to E Bank 3, location 1431 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

134. Press the MONITOR indicator switch to the on (illuminated) position.

135. Press the CL Key.

136. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

137. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

138. Press the PROCEED button.

139. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

140. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

141. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

142. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count 10239.06 within ± 2 counts in the least significant counter position. Stamp data sheet.

TTEST12 - PROGRAM ANALYSIS

TTEST12 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 4. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-4 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 4 switches to zero and displays the number 07500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

143. Set the FREQUENCY COUNTER FREQ-TIME switch to the first μs position.

144. Set the T12 COUNTER STOP switch to the ON position.

145. Transfer Control to E Bank 3, location 1433 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

146. Press the MONITOR indicator switch to the on (illuminated) position.

147. Press the CL Key.

148. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

149. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

150. Press the PROCEED button.

151. Verify the following events:

a. DSKY Register 1 displays 3-4 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

152. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

153. Verify that DSKY Register 2 displays 07500 with 00000 in DSKY Register 3. Stamp data sheet.

154. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 7500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST13 - PROGRAM ANALYSIS

TTEST13 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 5. The programmed functions of the test routine are in the order described below.

a. Clears the DSKY display and displays 3-5 in DSKY Register 1 positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 5 Counter and enters a CCS loop through the TIME 5 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 5 switches to zero and displays the number 05000 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

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155. Set the T12 COUNTER STOP switch to the ON position.

156. Transfer Control to E Bank 3, location 1454 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

157. Press the MONITOR indicator switch to the on (illuminated) position.

158. Press the CL Key.

159. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

160. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

161. Press the PROCEED button.

162. Verify the following events:

a. DSKY Register 1 displays 3-5 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

163. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

164. Verify that DSKY Register 2 displays 05000 with 00000 in DSKY Register 3. Stamp data sheet.

165. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 5000 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST14 - PROGRAM ANALYSIS

TTEST14 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 1. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-1 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 1 Counter and enters a CCS loop through the TIME 1 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 1 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

166. Set the T12 COUNTER STOP switch to the ON position.

167. Transfer Control to E Bank 3, location 1474 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

168. Press the MONITOR indicator switch to the on (illuminated) position.

169. Press the CL Key.

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170. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

171. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

172. Press the PROCEED button.

173. Verify the following events:

a. DSKY Register 1 displays 4-1 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

174. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

175. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

176. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST15 - PROGRAM ANALYSIS

TTEST15 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 2. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-2 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 2 Counter and enters a CCS loop through the TIME 2 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 2 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

177. Set the T12 COUNTER STOP switch to the ON position.

178. Transfer Control to E Bank 3, location 1515 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

179. Press the MONITOR indicator switch to the on (illuminated) position.

180. Press the CL Key.

181. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

182. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

183. Press the PROCEED button.

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184. Verify the following events:

a. DSKY Register 1 display 4-2 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

185. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

186. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

187. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST16 - PROGRAM ANALYSIS

TTEST16 measures the time elapse (phase) between the incrementing of TIME 3 and TIME 6. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-6 in DSKY Register 1, positions 2 through 4.

b. Deposits a Negative Full Scale number into the TIME 6 Counter and enables the T6 Rupt (Bit 16 of Channel 13).

c. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

d. After TIME 3 changes to zero, the program starts the external counter (FREQUENCY COUNTER) and inserts a 1 into the TIME 6 Counter.

e. Samples the TIME 6 Counter for a negative zero condition, and after detecting this condition, stops the external counter.

f. Displays the number 03125 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

188. Set the T12 COUNTER STOP switch to the ON position.

189. Transfer Control to E Bank 3, location 1537 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

190. Press the MONITOR indicator switch to the on (illuminated) position.

191. Press the CL Key.

192. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

193. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

194. Press the PROCEED button.

195. Verify the following events:

a. DSKY Register 1 displays 3-6 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

196. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

197. Verify that DSKY Register 2 displays 03125 with 00000 in DSKY Register 3. Stamp data sheet.

198. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 312.5 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

WARNING TEST (WTEST) - PROGRAM ANALYSIS

The purpose of this test is to check the Warning Alarm. Upon entering the test, the state of the Warning Alarm is examined. If the Warning Alarm has been set the program will energize the Computer Activity (COMP ACTY) indicator on the DSKY. A Warning Alarm condition will also illuminate the AGC ALARMS indicator 9 on the LOGIC DRAWER NO. 1 panel of the CTS. The program then provides a 15 second delay during which, the Warning Light should be extinguished (if illuminated). If the Warning Light is still on at the end of this period, the program will enter the STOP Fail routine and the test will be terminated. If the preliminary check was successful, eight additional checks will be performed. Failure of anyone of these checks is indicated in the form of a (15 second) display in DSKY Register 1 without terminating the test. A failure indication is characterized by a 9-displayed in positions 2 and 3 followed by the check number in position 4. (For example if Check #1 fails, Register 1 will display 9-1.) After the failure indication has been displayed for 15 seconds the program will continue on to the next check. The eight checks employ the same philosophy. Each is concerned with pulsing the test alarm bit every "Y" seconds over a period of "Z" seconds. The state of the warning bit is examined at the end of the "Z" seconds and, if it is not what is expected, there is a 15 second fail display.

Each time the Test Alarm bit is pulsed (i.e., every "Y" seconds during a check), the state of the warning bit is checked. The COMP ACTY indicator on the DSKY is then used to indicate the condition of the warning bit. If the warning bit is on the COMP ACTY indicator will be turned on. If the warning bit is off the COMP ACTY indicator will be extinguished.

During the performance of a particular check, the DSKY will display the following:

R1 = 8- "test #(1-8)"

R2 = "Y" - how often the test alarm bit is being pulsed (shown in seconds and hundredths of seconds)

R3 = "Z" - length of time over which the alarm bit is pulsed (in seconds).

At the end of the check, R2 and R3 are blanked and, if success, 8-"test #" remains in R1. Otherwise R1 becomes 9- "test #".

The specifications for each check are shown in table 1.

Table 1. Alarm Test Specifications

Check No.	R1 Display	R2 (Y)*	R3 (Z)	Initial Warning State	End Expected Warning State
1	8-1	3.00	60	OFF	OFF
2	8-2	2.00	60	OFF	OFF or ON accepted
3	8-3	1.00	12	OFF	ON
4	8-4	0.16	1	OFF	ON
5	8-5	0.50	60	ON	ON
6	8-6	1.00	60	ON	ON
7	8-7	2.00	60	ON	OFF or ON accepted
8	8-8	3.00	60	ON	OFF

*(1 pulse every Y.YY secs. for ZZ seconds)

199. Set the T12 COUNTER STOP switch to the ON position.

200. Transfer Control to E Bank 4, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

201. Press the MONITOR indicator switch to the on (illuminated) position.

202. Press the CL Key.

203. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

204. Press the PROCEED button.

205. Verify that the DSKY COMP ACTY indicator is illuminated and DSKY Register 1 displays 8-1.

206. Verify that the DSKY COMP ACTY indicator is extinguished and the DSKY Registers display the following:

Register	Display
1	8-1
2	00300
3	00060

207. Verify that DSKY Registers 2 and 3 are blanked and 8-1 remains in DSKY Register 1. Stamp data sheet.

NOTE: Several checks to follow have extremely short DSKY display times. It is suggested that verification of these checks be initially recorded by a check mark on the JDC sheet itself. The data sheet is then stamped immediately on the conclusion of the WARNING test.

208. Verify that the DSKY Registers display the following:

Register	Display
1	8-2
2	00200
3	00060

209. Verify that the DSKY COMP ACTY indicator is illuminated but extinguishes in less than a minute.

210. Verify that DSKY Registers 2 and 3 are blanked with 8-2 still in DSKY Register 1. Stamp data sheet.

211. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-3
2	00100
3	00012

212. Verify that DSKY Registers 2 and 3 are blanked, the COMP ACTY indicator is extinguished, and DSKY Register 1 still displays 8-3. Stamp data sheet.

213. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-4
2	00016
3	00001

Stamp data sheet.

214. Verify that the DSKY Registers display the following:

Register	Display
1	8-5
2	00050
3	00060

215. Verify that the DSKY COMP ACTY indicator is illuminated.

216. Verify that the DSKY Registers 2 and 3 are blanked, the DSKY COMP ACTY indicator is still illuminated, and DSKY Register 1 still displays 8-5. Stamp data sheet.

217. Verify that the DSKY Register 1 is blanked and the COMP ACTY indicator is extinguished.

218. Verify that the DSKY Registers display the following:

Register	Display
1	8-6
2	00100
3	00060

219. Verify that the COMP ACTY indicator is illuminated.

220. Verify that DSKY Registers 2 and 3 are blanked with the COMP ACTY indicator still illuminated and 8-6 is still displayed in Register 1. Stamp data sheet.

221. Verify that the COMP ACTY indicator is extinguished and the DSKY Registers now display the following:

Register	Display
1	8-7
2	00200
3	00060

222. Verify that the COMP ACTY indicator illuminates.

223. Verify that DSKY Registers 2 and 3 are blanked with 8-7 still displayed in DSKY Register 1. Stamp data sheet.

224. Verify that the COMP ACTY indicator extinguishes.

225. Verify that DSKY Register 1 flashes 8-7 once.

226. Verify that the DSKY Registers now display the following:

Register	Display
1	8-8
2	00300
3	00060

227. Verify that the DSKY Registers 2 and 3 are blanked with 8-8 still displayed in Register 1.

228. Verify that DSKY Registers now display the following success indication.

Register	Display
1	8-8
2	99999
3	99999

Stamp data sheet.

229. A failure indication of any one of the eight checks will be displayed in DSKY Register 1 at the end of that particular check. The failure display will be an 8-9 presented in positions 2 through 4 of Register 1. In the event a failure occurs rerun the test by performing steps 199 through 204 again. If the failure reoccurs discontinue further testing.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 8

JDC
NO. 05773
REV. E
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

ASSEMBLY UNDER TEST
TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY
DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ____ SER. NO. ____ CAL DATE ____
NAME ____ SER. NO. ____ CAL DATE ____

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
18.	TTEST4 - Ready for Standby	FREQUENCY COUNTER is counting. DSKY Register 1 is 24-4. DSKY Register 2 and 3 are blank.	
21.	TTEST4 - Amount of time spent in Standby	Computer operated in the Standby mode for a period of	
22.	TTEST4 - Out of Standby	DSKY STBY indicator extinguishes. DSKY PRO (STBY) Key depressed NMT three times.	
28.	TTEST4 - Measurement	FREQUENCY COUNTER totals	
29.	TTEST4 - DSKY Display - Calculations	Registers 2 and 3 displays DSKY NUM/32	
31.	TTEST4 - Evaluation	The data recorded in step 28 agrees with the results of the Calculation of step 29 within ± 0.2 milliseconds.	
39.	TTEST1 - Start Check	DSKY Register 1 is 24-1, FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	

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EQUIPMENT TEST
DATA SHEET 2 OF 8

JDC
NO. 05773
REV. E

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
40.	TTEST1 - Measurement	FREQUENCY COUNTER totals	
41.	TTEST1 - DSKY Displays	5120	
42.	TTEST1 - Evaluation	Results in steps 40 and 41 are within ±2 counts in the least significant counter position.	
50.	TTEST2 - Start Check	DSKY Register 1 is 24-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
51.	TTEST2 - Measurement	FREQUENCY COUNTER totals	
52.	TTEST2 - DSKY Displays	00010	
53.	TTEST2 - Evaluation	Results in steps 51 and 52 are within ±2 counts in the least significant counter position.	
61.	TTEST3 - Start Check	DSKY Register 1 is 24-3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
62.	TTEST3 - Measurement	FREQUENCY COUNTER totals	
63.	TTEST3 - DSKY Displays	5120	
64.	TTEST3 - Evaluation	Results in steps 62 and 63 are within ±2 counts in the least significant counter position.	

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EQUIPMENT TEST
DATA SHEET 3 OF 8

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NO. 05773
REV. E

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
72.	TTEST5 - Start Check	DSKY Register 1 is 1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
73.	TTEST5 - Measurement	FREQUENCY COUNTER totals	
74.	TTEST5 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
75.	TTEST5 - Evaluation	Results in steps 73 and 74 are within ±2 counts in the least significant counter position.	
83.	TTEST6 - Start Check	DSKY Register 1 is 2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
84.	TTEST6 - Measurement	FREQUENCY COUNTER totals	
85.	TTEST6 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
86.	TTEST6 - Evaluation	Results in steps 84 and 85 are within ± 2 counts in the least significant counter position.	
94.	TTEST7 - Start Check	DSKY Register 1 is 3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
95.	TTEST7 - Measurement	FREQUENCY COUNTER totals	

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EQUIPMENT TEST
DATA SHEET 4 OF 8

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JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
96.	TTEST7 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
97.	TTEST7 - Evaluation	Results in steps 95 and 96 are within ±2 counts in the least significant counter position.	
105.	TTEST8 - Start Check	DSKY Register 1 is 4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
106.	TTEST8 - Measurement	FREQUENCY COUNTER totals	
107.	TTEST8 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
108.	TTEST8 - Evaluation	Results in steps 106 and 107 are within ±2 counts in the least significant counter position.	
116.	TTEST9 - Start Check	DSKY Register 1 is 5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
117.	TTEST9 - Measurement	FREQUENCY COUNTER totals	
118.	TTEST9 - DSKY Displays	Reg. 2 = 16383, Reg. 3 - 00000	
119.	TTEST9 - Evaluation	Results in steps 117 and 118 are within ±2 counts in the least significant counter position.	

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EQUIPMENT TEST
DATA SHEET 5 OF 8

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NO. 05773
REV. E

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
128.	TTEST10 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
129.	TTEST10 - Measurement	FREQUENCY COUNTER totals	
130.	TTEST10 - DSKY Displays	Reg. 2 = 10239, Reg. 3 - 06000	
131.	TTEST10 - Evaluation	Results in steps 129 and 130 are within ±2 counts in the least significant counter position.	
139.	TTEST11 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
140.	TTEST11 - Measurement	FREQUENCY COUNTER totals	
141.	TTEST11 - DSKY Displays	Reg. 2 = 10239, Reg. 3 = 06000	
142.	TTEST11 - Evaluation	Results in steps 140 and 141 are within ±2 counts in the least significant counter position.	
151.	TTEST12 - Start Check	DSKY Register 1 is 3-4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
152.	TTEST12 - Measurement	FREQUENCY COUNTER totals	

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EQUIPMENT TEST
DATA SHEET 6 OF 8

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NO. 05773
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JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
153.	TTEST12 - DSKY Displays	Reg. 2 = 07500, Reg. 3 = 00000	
154.	TTEST12 - Evaluation	Results in steps 152 and 153 are within ±2 counts in the least significant counter position.	
162.	TTEST13 - Start Check	DSKY Register 1 is 3-5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
163.	TTEST13 - Measurement	FREQUENCY COUNTER totals	
164.	TTEST13 - DSKY Displays	Reg. 2 = 05000, Reg. 3 = 00000	
165.	TTEST13 - Evaluation	Results in steps 163 and 164 are within ±2 counts in the least significant counter position.	
173.	TTEST14 - Start Check	DSKY Register 1 is 4-1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
174.	TTEST14 - Measurement	FREQUENCY COUNTER totals	
175.	TTEST14 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
176.	TTEST14 - Evaluation	Results in steps 174 and 175 are within ±2 counts in the least significant counter position.	

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JDC
NO. 05773
REV. E

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
184.	TTEST15 - Start Check	DSKY Register 1 is 4-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
185.	TTEST15 - Measurement	FREQUENCY COUNTER totals	
186.	TTEST15 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
187.	TTEST15 - Evaluation	Results in steps 185 and 186 are within ±2 counts in the least significant counter position.	
195.	TTEST16 - Start Check	DSKY Register 1 is 3-6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
196.	TTEST16 - Measurement	FREQUENCY COUNTER totals	
197.	TTEST16 - DSKY Displays	Reg. 2 = 03125, Reg. 3 = 00000	
198.	TTEST16 - Evaluation	Results in steps 196 and 197 are within ±2 counts in the least significant counter position.	
207.	WTEST Check No. 1	DSKY Register 1 is 8-1. DSKY Registers 2 and 3 are blank.	
210.	WTEST Check No. 2	DSKY Register 1 is 8-2 and Flashes twice. DSKY Registers 2 and 3 are blank.	

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DATA SHEET 8 OF 8

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NO. 05773
REV. E

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
212.	WTEST Check No. 3	DSKY Register 1 is 8-3. DSKY Registers 2 and 3 are blank.	
213.	WTEST Check No. 4	DSKY Register 1 is 8-4. DSKY Registers 2 and 3 are 00016 and 00001 respectively.	
216.	WTEST Check No. 5	DSKY Register 1 is 8-5. DSKY Registers 2 and 3 are blank.	
220.	WTEST Check No. 6	DSKY Register 1 is 8-6. DSKY Registers 2 and 3 are blank. DSKY COMP ACTY is on.	
223.	WTEST Check No. 7	DSKY Register 1 is 8-7. DSKY Registers 2 and 3 are blank.	
228.	WTEST8 and Success Display	DSKY Register 1 is 8-8. DSKY Register 2 is 99999. DSKY Register 3 is 99999.	

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JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

JDC 05773 REV. F PAGE 1 OF 20

INITIAL TDRR 32809 D.S. PGS 8

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION Tests the outputs of both the High-order (Channel 3) and Low-order (Channel 4) scalers, along with Time Counters T2 through T6. E Memory retention in the Standby mode is checked during the scaler test. The last section of this test checks the operation of the warning alarm. A brief analysis is included as a preface to each specific test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	4-20-67	33626	1	-	EA	-
B	10-12-67	34824	2,4-16,18,20	8	EA	-
C	10-20-67	34887	1, 11-16, 18	-	EA	-
D	3-29-68	35992	1,2,4	1	EA	-
E	10-17-68	36906	4	-	EA	-
F	3-5-69	37384	16	-	EA	-

REFERENCES JDC's 05406, 05407, 05412, 05413, 05414, 05403
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program TIME AND WARNING CHECKS Mylar Tape, JDC 05774

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the FREQUENCY COUNTER.

3. On the XY Interface Panel:

a. Set the CHANNEL T switches to position 211.

b. Set the FREQ + PHASE switch to the FRT T →S position.

4. Prepare the CTS FREQUENCY COUNTER for operation as specified by JDC 05403, and verify that coaxial cables are present and connected as follows:

XY Interface Panel	to	A20 Panel
CNTR-A jack		CNTR A jack
Frequency Counter	to	A20 Panel
FREQ A - DC jack		CNTR A jack

5. On the FREQUENCY COUNTER set:
FUNCTION switch to PERIOD A
FREQ-TIME switch to µS.
DISPLAY control to ∞.
TRIGGER LEVEL vernier for display of 312.5 ±1.0.

6. Set CHANNEL T switches to position 212, and set the FREQUENCY COUNTER FUNCTION switch to the PERIOD A position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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7. Set the FREQ - TIME switch to the MS scale-center position. Verify that the Display decimal point is located between the first and second least significant digits, i. e., 000000. 0. Set the DISPLAY Control to the maximum clockwise position.

8. Load Program TIME AND WARNING CHECKS (JDC 05774) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

9. Rewind tape and verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).

10. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

TTEST4-PROGRAM ANALYSIS Loads E BANKS with CHECKERS. The external (FREQUENCY COUNTER) clock is triggered and Channels 3 and 4 are stored in location 0065 and 0066. The computer then waits for the operator to switch to Standby. After Standby an operator TC to 0373 will resume the program, storing the updated scaler count in locations 67 and 70, stopping the external Counter, and performing a CHECK SUM of E Memory CHECKERS. If the CHECKSUM is correct, program will subtract 0065 from 0067 and 0066 from 0070 and display the total difference in DSKY Register 2 and 3. In order to convert the DSKY count to milliseconds the operator must divide it by 32 out to 7 places. The quotient is then compared with the count displayed on the Frequency counter to verify scaler continuity during standby.

11. Transfer Control to Location 0250 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

12. Press the MONITOR indicator switch to the on (illuminated) position.

13. Press the CL Key.

14. Press the RESET button on the FREQUENCY COUNTER and Verify the display is zeroed.

15. Set the T12 COUNTER STOP switch to the OFF position.

16. Set the INHIBIT INCREMENTS switch to the OFF position.

17. Press the PROCEED button.

18. Let the computer run for approximately 10 seconds. Verify the conditions listed below are present by stamping data sheet.

a. FREQUENCY COUNTER is counting.

b. DSKY Register 1 displays 24-4.

c. DSKY Registers 2 and 3 are blank.

19. Hold down the DSKY PRO (STBY) Key until the STBY indicator illuminates and time the interval. (Indicator should illuminate within 2.00 seconds after the PRO (STBY) Key has been depressed.)

20. Set the T12 COUNTER STOP switch to the ON position.

21. Allow the computer to remain in the Standby mode for period longer than 3 minutes but less than 15 minutes. Record the amount of time spent in the Standby mode on the data sheet.

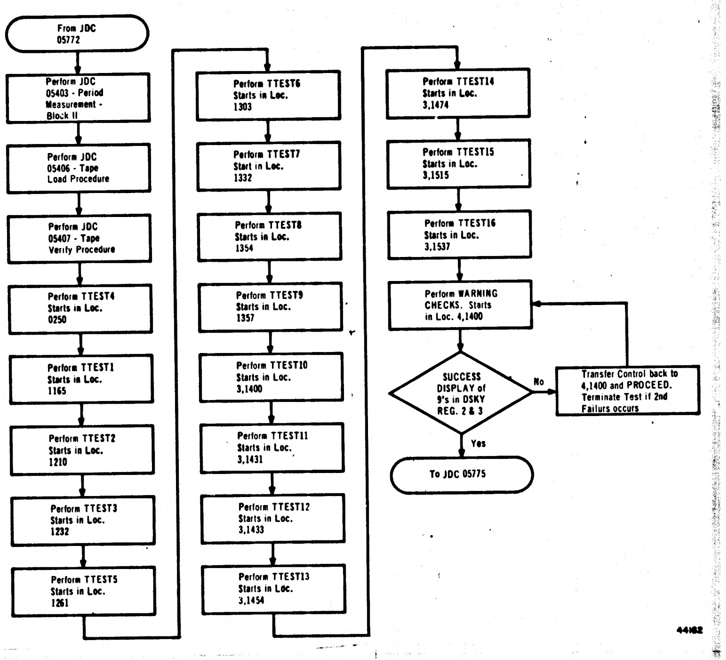
From JDC 05772
Perform JDC 05403 - Period Measurement - Block II
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 - Tape Verify Procedure
Perform TTEST4 Starts in Loc. 0250
Perform TTEST1 Starts in Loc. 1165
Perform TTEST2 Starts in Loc. 1210
Perform TTEST3 Starts in Loc. 1232
Perform TTEST5 Starts in Loc. 1261
Perform TTEST6 Starts in Loc. 1303
Perform TTEST7 Start in Loc. 1332
Perform TTEST8 Starts in Loc. 1354
Perform TTEST9 Starts in Loc. 1357
Perform TTEST10 Starts in Loc. 3,1400
Perform TTEST11 Starts in Loc. 3,1431
Perform TTEST12 Starts in Loc. 3,1433
Perform TTEST13 Starts in Loc. 3,1454
Perform TTEST14 Starts in Loc. 3,1474
Perform TTEST15 Starts in Loc. 3,1515
Perform TTEST16 Starts in Loc. 3,1537
Perform WARNING CHECKS. Starts in Loc. 4,1400
SUCCESS DISPLAY of 9's in DSKY REG. 2 & 3
No
Transfer Control back to 4,1400 and PROCEED. Terminate Test if 2nd Failurs occurs
Yes
To JDC 05775
44162

Figure 1. Flowchart for Performing Program TIME AND WARNING CHECKS

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22. Depress and hold the DSKY PRO (STBY) Key for a minimum of three seconds or until the STBY indicator extinguishes, whichever occurs first. If STBY does not extinguish, release and depress again, up to a maximum of three times (RESTART may illuminate). Record on Data Sheet, number of times DSKY PRO (STBY) Key was depressed.

A. On the CTS:
Depress FRESH START
Depress PROCEED
Depress ALARM RESET
B. Depress RSET KEY on DSKY.

23. Transfer Control to Location 0373 using the procedures of JDC 05412.

24. Press the MONITOR indicator switch to the on (illuminated) position.

25. Press the CL Key.

26. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

27. Press the PROCEED button.

28. Verify that the FREQUENCY COUNTER stops counting and immediately record total count.

29. Verify that DSKY Registers 2 and 3 display a number (with a minimum of eight digits total). Record the number on the data sheet. Also divide the DSKY number by 32 and record results on the data sheet.

30. If the DSKY displays all 9's in Registers 2 and 3 the computer has failed the CHECKER BOARD CHECKSUM portion of this test. Proceed to step 7 of this procedure and perform all successive steps again. If the test fails again discontinue further testing.

31. Compare results of steps 28 and 29. Stamp data sheet.

TTEST1 - PROGRAM ANALYSIS

This test segment checks the time required for Channel 4 to count from zero, to full scale. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-1 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER.) The program then re-enters the same Channel 4 full scale check subroutine described above. Immediately after Channel 4 increments through zero again, the program retriggers the external clock, halts the time counter, and sets up the number 5120 in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement with ± 2 counts in the least significant position.

32. Set the T12 COUNTER STOP switch to the ON position.

33. Transfer Control to Location 1165 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

34. Press the MONITOR indicator switch to the on (illuminated) position.

35. Press the CL Key.

36. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

37. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

38. Press the PROCEED button.

39. Verify the following events:

a. DSKY Register 1 displays 24-1.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

40. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

41. Verify that the DSKY Register 2 Displays 5120. Stamp data sheet.

42. Verify that the number displayed on the FREQUENCY COUNTER equals the DSKY number 5120 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST2 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 4 to count from zero to 32. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-2 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). The program then reenters the same Channel 4 full scale check subroutine described above, except that an octal 37 is used for a constant in place of the full scale constant. (Octal 37 is equal to decimal 31.) Immediately after Channel 4 reaches the 32nd count, the program retriggers the external clock, halts the time counter, and sets up the number 10 (00010) in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (00010) by the DSKY and verifying agreement within ±2 counts in the least significant position.

43. Set the T12 COUNTER STOP switch to the ON position.

44. Transfer Control to Location 1210 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

45. Press the MONITOR indicator switch to the on (illuminated) position.

46. Press the CL Key.

47. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

48. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

49. Press the PROCEED button.

50. Verify the following events:

a. DSKY Register 1 displays 24-2.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

51. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

52. Verify that the DSKY Register 2 displays 00010. Stamp data sheet.

53. Verify the number displayed on the FREQUENCY COUNTER equals the DSKY number (00010) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST3 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 3 to increment once. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-3 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). After activating the FREQUENCY COUNTER the program sets up the number 5120 in DSKY display Register 2. The program then stores the contents of Channel 3 into Register L and enters a negative 1 into location 0075 to be Indexed later. The program enters a subroutine monitoring the state of Channel 3. This subroutine is similar to the one described above except that the RXOR instruction is transformed to RXOR Channel 3 (instead of 4) by the -1 in the Index location. As soon as a difference is detected in the value of Channel 3 (caused by an increment pulse) the program will retrigger the external clock halting the time measurement. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement within ±2 counts in the least significant position.

54. Set the T12 COUNTER STOP switch to the ON position.

55. Transfer Control to Location 1232 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

56. Press the MONITOR indicator switch to the on (illuminated) position.

57. Press the CL Key.

58. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

59. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

60. Press the PROCEED button.

61. Verify the following events:

a. DSKY Register 1 displays 24-3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

62. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

63. Verify that the DSKY Register 2 displays 5120. Stamp data sheet.

64. Verify that the number displayed on the number (5120) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST5 - PROGRAM ANALYSIS

The program routines comprising Time Test 5 are designed to measure the time required for the TIME 1 Counter to count from 1, through full scale, and back to zero. The TTEST5 programmed test functions and executed in the order listed below.

a. Clears the DSKY Registers and displays the number 1 in position 3 of DSKY Register 1.

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b. Deposits zeros in location 0025 (TIME 1 Counter) and sample loops 0025 for the first count (or a count of 1).

c. Detecting a count of 1, the program will switch to a subroutine to start the external clock (FREQUENCY COUNTER). After starting the external clock the program returns to a sample loop, this time testing for a positive zero condition in 0025.

d. Detecting that 0025 is positive zero, the program switches to a subroutine to stop the external clock. The program then enters a display routine which places the number 16383 in DSKY Register 2, and 00000 in DSKY Register 3. The DSKY displays (Registers 2 and 3) are read as one number, 163,830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

65. Set the T12 COUNTER STOP switch to the ON position.

66. Transfer Control to Location 1261 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

67. Press the MONITOR indicator switch to the on (illuminated) position.

68. Press the CL Key.

69. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

70. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

71. Press the PROCEED button.

72. Verify the following events:

a. DSKY Register 1 displays a 1 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

73. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

74. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

75. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST6 - PROGRAM ANALYSIS

The program routines comprising Time Test 6 are designed to measure the time required for the TIME2 Counter to count from 1, through full scale, and back to zero. The TTEST6 programmed test functions are executed in the order described below.

a. Clears the DSKY Registers and displays the number 2 in position 3 of DSKY Register 1.

b. Starts the external clock (FREQUENCY COUNTER) immediately after the next transition of the TIME 1 counter.

c. Deposits a count of 1 into the TIME 2 Counter.

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d. Deposits a positive full scale (37777) number into the TIME 1 counter.

e. Enters a sample loop through TIME 1, waiting for the TIME 1 Counter to increment from full scale to zero. This transition indicates that the TIME 2 Counter has been incremented.

f. When the TIME 1 Counter switches to zero, the program will check the TIME 2 Counter for a positive zero condition. If positive zero is not present in the TIME 2 Counter, the program will form a jump loop cycling through the functions described in d and e above, until such time as the TIME 2 Counter is finally incremented back to zero.

g. When a positive zero condition is detected (approximately 163,830 milliseconds later) in the TIME 2 Counter, the program will continue on, first halting the FREQUENCY COUNTER and then entering the DSKY display routine. The DSKY displays (registers 2 and 3) are read as one number, 163.830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

76. Set the T12 COUNTER STOP switch to the ON position.

77. Transfer Control to Location 1303 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

78. Press the MONITOR indicator switch to the on (illuminated) position.

79. Press the CL Key.

80. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

81. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

82. Press the PROCEED button.

83. Verify the following events:

a. DSKY Register 1 displays a 2 in position 3.

b. The FREQUENCY COUNTER IS counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

84. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

85. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

86. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST7, 8, and 9 - PROGRAM ANALYSIS

TTEST7 measures the time required to increment the TIME 3 Counter from 1, through full scale, and back to zero. TTEST8 measures the time required to increment the TIME 4 Counter from 1, through fully scale, and back to zero. TTEST9 measures the time required to increment the TIME 5 Counter from 1, through full scale, and back to zero. When performing these combined tests the operational sequence starts with Time Test 7 (location 1332), and after the results are displayed the program is continued by a manual Transfer of Control to location 1354 (Time Test 8). After obtaining the results of this test, the program is continued by another manual Transfer of Control to location 1357 for Time Test 9.

All three tests utilize a common routine which clears the DSKY display, starts the external counter after 1 is detected in the TIME Counter being tested, stops the external counter after zero is detected in the TIME Counter under test, and displays the specified elapsed time in DSKY Registers 2 and 3. The common routine is tied into each test by initialization procedures which set the Index location to a value that will produce the proper counter address according to the Time Test being performed. The programmed functions of the common routine are executed in the order described below.

a. Clears the DSKY Registers and displays the test number in position 3 of DSKY Register 1. (Displays 3 for TTEST7, 4 for TTEST8, and 5 for TTEST9.)

b. Deposits positive zero into the TIME Counter under test.

c. Starts the external clock (FREQUENCY COUNTER) immediately after the TIME Counter increments to a count of 1.

d. Enters a sample loop through the TIME Counter location, and looks for a positive zero condition in the TIME Counter.

e. When the TIME Counter reaches positive zero, the program halts the external clock, and enters the DSKY display routine. The DSKY displays (Register 2 and 3) are read as one number 163,830. This number will be displayed at the end of each Time Test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

87. Set the T12 COUNTER STOP switch to the ON position.

88. Transfer Control to Location 1332 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

89. Press the MONITOR indicator switch to the on (illuminated) position.

90. Press the CL Key.

91. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

92. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

93. Press the PROCEED button.

94. Verify the following events:

a. DSKY Register 1 displays a 3 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

95. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

96. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

97. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

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98. Set the T12 COUNTER STOP switch to the ON position.

99. Transfer Control to Location 1354 using the procesures of JDC 05412 (Transfer Control Operating Procedure).

100. Press the MONITOR indicator switch to the on (illuminated) position.

101. Press the CL Key.

102. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

103. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

104. Press the PROCEED button.

105. Verify the following events:

a. DSKY Register 1 displays a 4 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

106. Verify the the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

107. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

108. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

109. Set the T12 COUNTER STOP switch to the ON position.

110. Transfer Control to Location 1357 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

111. Press the MONITOR indicator switch to the on (illuminated) position.

112. Press the CL Key.

113. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

114. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

115. Press the PROCEED button.

116. Verify the following events:

a. DSKY Register 1 displays a 5 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

117. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

118. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

119. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST10 AND 11 - PROGRAM ANALYSIS

TTEST10 measures the time required to decrement the TIME 6 Counter from positive full scale to minus zero. TTEST11 measures the time required to decrement the TIME 6 Counter from full scale to minus zero. The elapsed time measured should result in 10.23906 seconds in both tests. Both tests utilize a common routine to clear the DSKY display, set the TIME 3 Counter set Bit 16 of Channel 13, start the external counter, monitor TIME 6 for a minus zero, and stop the external counter. When performing these tests, the operational sequence starts with Time Test 10 (location 3,1400) and stops when the results are displayed in DSKY Registers 2 and 3. The operator continues the program by Transferring Control to Time Test 11 (location 3,1431). The program also stops on this test when the results are displayed in DSKY Registers 2 and 3. Between the two tests only the initialization procedures are different. During the initialization of Time Test 10, the TIME 6 counter is loaded with a positive full scale number. During the initialization of Time Test 11, the TIME 6 counter is loaded with a negative full scale number. The programmed functions of the routine common to both tests are executed in the order described below.

a. Deposits number (Positive Full Scale for TTEST10 and Negative Full Scale for TTEST11) into the TIME 6 Counter (location 0031).

b. Clears the DSKY Registers and displays the number 6 in position 3 of DSKY Register 1.

c. Sets a Positive Full Scale number into the TIME 3 Counter and CCS loops TIME 3 sampling for an increment back to zero.

d. After TIME 3 increments to zero, the program sets the Enable T6 Rupt (Bit 15, Channel 13) and starts the external counter (FREQUENCY COUNTER).

e. Enters a CCS loop through the TIME Counter location sampling for a minus zero.

f. Stops the external counter immediately after TIME 6 switches to minus zero and displays the number 10239 in DSKY Register 2 and 06000 in DSKY Register 3. This number will be displayed at the end of each test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement with ± 2 counts in the least significant counter position.

120. Set the FREQUENCY COUNTER FREQ-TIME switch to the third MS position. Verify that the decimal point is positioned between the second and third least significant counter digits, i.e., 00000.00.

121. Set the T12 COUNTER STOP switch to the ON position.

122. Transfer Control to E Bank 3, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

123. Press the MONITOR indicator switch to the on (illuminated) position.

124. Press the CL Key.

125. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

126. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

127. Press the PROCEED button.

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128. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

129. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

130. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

131. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 10239.06 milliseconds within ± 2 counts in the least significant counter position. Stamp data sheet.

132. Set the T12 COUNTER STOP switch to the ON position.

133. Transfer Control to E Bank 3, location 1431 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

134. Press the MONITOR indicator switch to the on (illuminated) position.

135. Press the CL Key.

136. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

137. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

138. Press the PROCEED button.

139. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

140. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

141. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

142. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count 10239.06 within ± 2 counts in the least significant counter position. Stamp data sheet.

TTEST12 - PROGRAM ANALYSIS

TTEST12 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 4. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-4 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 4 switches to zero and displays the number 07500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

143. Set the FREQUENCY COUNTER FREQ-TIME switch to the first μs position.

144. Set the T12 COUNTER STOP switch to the ON position.

145. Transfer Control to E Bank 3, location 1433 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

146. Press the MONITOR indicator switch to the on (illuminated) position.

147. Press the CL Key.

148. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

149. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

150. Press the PROCEED button.

151. Verify the following events:

a. DSKY Register 1 displays 3-4 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

152. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

153. Verify that DSKY Register 2 displays 07500 with 00000 in DSKY Register 3. Stamp data sheet.

154. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 7500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST13 - PROGRAM ANALYSIS

TTEST13 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 5. The programmed functions of the test routine are in the order described below.

a. Clears the DSKY display and displays 3-5 in DSKY Register 1 positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 5 Counter and enters a CCS loop through the TIME 5 location sampling for a zero condition

e. Stops the external counter immediately after TIME 5 switches to zero and displays the number 05000 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

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155. Set the T12 COUNTER STOP switch to the ON position.

156. Transfer Control to E Bank 3, location 1454 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

157. Press the MONITOR indicator switch to the on (illuminated) position.

158. Press the CL Key.

159. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

160. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

161. Press the PROCEED button.

162. Verify the following events:

a. DSKY Register 1 displays 3-5 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

163. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

164. Verify that DSKY Register 2 displays 05000 with 00000 in DSKY Register 3. Stamp data sheet.

165. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 5000 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST14 - PROGRAM ANALYSIS

TTEST14 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 1. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-1 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 1 Counter and enters a CCS loop through the TIME 1 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 1 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

166. Set the T12 COUNTER STOP switch to the ON position.

167. Transfer Control to E Bank 3, location 1474 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

168. Press the MONITOR indicator switch to the on (illuminated) position.

169. Press the CL Key.

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170. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

171. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

172. Press the PROCEED button.

173. Verify the following events:

a. DSKY Register 1 displays 4-1 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

174. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

175. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

176. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST15 - PROGRAM ANALYSIS

TTEST15 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 2. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-2 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 2 Counter and enters a CCS loop through the TIME 2 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 2 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ± 2 counts in the least significant counter position.

177. Set the T12 COUNTER STOP switch to the ON position.

178. Transfer Control to E Bank 3, location 1515 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

179. Press the MONITOR indicator switch to the on (illuminated) position.

180. Press the CL Key.

181. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

182. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

183. Press the PROCEED button.

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184. Verify the following events:

a. DSKY Register 1 display 4-2 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

185. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

186. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

187. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST16 - PROGRAM ANALYSIS

TTEST16 measures the time elapse (phase) between the incrementing of TIME 3 and TIME 6. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-6 in DSKY Register 1, positions 2 through 4.

b. Deposits a Negative Full Scale number into the TIME 6 Counter and enables the T6 Rupt (Bit 16 of Channel 13).

c. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

d. After TIME 3 changes to zero, the program starts the external counter (FREQUENCY COUNTER) and inserts a 1 into the TIME 6 Counter.

e. Samples the TIME 6 Counter for a negative zero condition, and after detecting this condition, stops the external counter.

f. Displays the number 03125 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

188. Set the T12 COUNTER STOP switch to the ON position.

189. Transfer Control to E Bank 3, location 1537 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

190. Press the MONITOR indicator switch to the on (illuminated) position.

191. Press the CL Key.

192. Set FREQ-TIME switch on Frequency Counter to second μS position. Press the RESET button on the Frequency Counter and verify that the display is zeroed.

193. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

194. Press the PROCEED button.

195. Verify the following events:

a. DSKY Register 1 displays 3-6 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

196. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

197. Verify that DSKY Register 2 displays 03125 with 00000 in DSKY Register 3. Stamp data sheet.

198. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 312.5 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

WARNING TEST (WTEST) - PROGRAM ANALYSIS

The purpose of this test is to check the Warning Alarm. Upon entering the test, the state of the Warning Alarm is examined. If the Warning Alarm has been set the program will energize the Computer Activity (COMP ACTY) indicator on the DSKY. A Warning Alarm condition will also illuminate the AGC ALARMS indicator 9 on the LOGIC DRAWER NO. 1 panel of the CTS. The program then provides a 15 second delay during which, the Warning Light should be extinguished (if illuminated). If the Warning Light is still on at the end of this period, the program will enter the STOP Fail routine and the test will be terminated. If the preliminary check was successful, eight additional checks will be performed. Failure of anyone of these checks is indicated in the form of a (15 second) display in DSKY Register 1 without terminating the test. A failure indication is characterized by a 9-displayed in positions 2 and 3 followed by the check number in position 4. (For example if Check #1 fails, Register 1 will display 9-1.) After the failure indication has been displayed for 15 seconds the program will continue on to the next check. The eight checks employ the same philosophy. Each is concerned with pulsing the test alarm bit every "Y" seconds over a period of "Z" seconds. The state of the warning bit is examined at the end of the "Z" seconds and, if it is not what is expected, there is a 15 second fail display.

Each time the Test Alarm bit is pulsed (i.e., every "Y" seconds during a check), the state of the warning bit is checked. The COMP ACTY indicator on the DSKY is then used to indicate the condition of the warning bit. If the warning bit is on the COMP ACTY indicator will be turned on. If the warning bit is off the COMP ACTY indicator will be extinguished.

During the performance of a particular check, the DSKY will display the following:

R1 = 8- "test #(1-8)"

R2 = "Y" - how often the test alarm bit is being pulsed (shown in seconds and hundredths of seconds)

R3 = "Z" - length of time over which the alarm bit is pulsed (in seconds).

At the end of the check, R2 and R3 are blanked and, if success, 8-"test #" remains in R1. Otherwise R1 becomes 9- "test #".

The specifications for each check are shown in table 1.

Table 1. Alarm Test Specifications

Check No.	R1 Display	R2 (Y)*	R3 (Z)	Initial Warning State	End Expected Warning State
1	8-1	3.00	60	OFF	OFF
2	8-2	2.00	60	OFF	OFF or ON accepted
3	8-3	1.00	12	OFF	ON
4	8-4	0.16	1	OFF	ON
5	8-5	0.50	60	ON	ON
6	8-6	1.00	60	ON	ON
7	8-7	2.00	60	ON	OFF or ON accepted
8	8-8	3.00	60	ON	OFF

*(1 pulse every Y.YY secs. for ZZ seconds)

199. Set the T12 COUNTER STOP switch to the ON position.

200. Transfer Control to E Bank 4, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

201. Press the MONITOR indicator switch to the on (illuminated) position.

202. Press the CL Key.

203. Set the T12 COUNTER STOP switch and the INHIBIT INCREMENTS switch to the OFF position.

204. Press the PROCEED button.

205. Verify that the DSKY COMP ACTY indicator is illuminated and DSKY Register 1 displays 8-1.

206. Verify that the DSKY COMP ACTY indicator is extinguished and the DSKY Registers display the following:

Register	Display
1	8-1
2	00300
3	00060

207. Verify that DSKY Registers 2 and 3 are blanked and 8-1 remains in DSKY Register 1. Stamp data sheet.

NOTE: Several checks to follow have extremely short DSKY display times. It is suggested that verification of these checks be initially recorded by a check mark on the JDC sheet itself. The data sheet is then stamped immediately on the conclusion of the WARNING test.

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208. Verify that the DSKY Registers display the following:

Register	Display
1	8-2
2	00200
3	00060

209. Verify that the DSKY COMP ACTY indicator is illuminated but extinguishes in less than a minute.

210. Verify that DSKY Registers 2 and 3 are blanked with 8-2 still in DSKY Register 1. Stamp data sheet.

211. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-3
2	00100
3	00012

212. Verify that DSKY Registers 2 and 3 are blanked, the COMP ACTY indicator is extinguished, and DSKY Register 1 still displays 8-3. Stamp data sheet.

213. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-4
2	00016
3	00001

Stamp data sheet.

214. Verify that the DSKY Registers display the following:

Register	Display
1	8-5
2	00050
3	00060

215. Verify that the DSKY COMP ACTY indicator is illuminated.

216. Verify that the DSKY Registers 2 and 3 are blanked, the DSKY COMP ACTY indicator is still illuminated, and DSKY Register 1 still displays 8-5. Stamp data sheet.

217. Verify that the DSKY Register 1 is blanked and the COMP ACTY indicator is extinguished.

218. Verify that the DSKY Registers display the following:

Register	Display
1	8-6
2	00100
3	00060

219. Verify that the COMP ACTY indicator is illuminated.

220. Verify that DSKY Registers 2 and 3 are blanked with the COMP ACTY indicator still illuminated and 8-6 is still displayed in Register 1. Stamp data sheet.

221. Verify that the COMP ACTY indicator is extinguished and the DSKY Registers now display the following:

Register	Display
1	8-7
2	00200
3	00060

---

222. Verify that the COMP ACTY indicator illuminates.

223. Verify that DSKY Registers 2 and 3 are blanked with 8-7 still displayed in DSKY Register 1. Stamp data sheet.

224. Verify that the COMP ACTY indicator extinguishes.

225. Verify that DSKY Register 1 flashes 8-7 once.

226. Verify that the DSKY Registers now display the following:

Register	Display
1	8-8
2	00300
3	00060

227. Verify that the DSKY Registers 2 and 3 are blanked with 8-8 still displayed in Register 1.

228. Verify that DSKY Registers now display the following success indication.

Register	Display
1	8-8
2	99999
3	99999

Stamp data sheet.

229. A failure indication of any one of the eight checks will be displayed in DSKY Register 1 at the end of that particular check. The failure display will be an 8-9 presented in positions 2 through 4 of Register 1. In the event a failure occurs rerun the test by performing steps 199 through 204 again. If the failure reoccurs discontinue further testing.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 8

JDC
NO. 05773
REV. F
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION ______ APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
18.	TTEST4 - Ready for Standby	FREQUENCY COUNTER is counting. DSKY Register 1 is 24-4. DSKY Register 2 and 3 are blank.	
21.	TTEST4 - Amount of time spent in Standby	Computer operated in the Standby mode for a period of	
22.	TTEST4 - Out of Standby	DSKY STBY indicator extinguishes. DSKY PRO (STBY) Key depressed NMT three times.	
28.	TTEST4 - Measurement	FREQUENCY COUNTER totals	
29.	TTEST4 - DSKY Display - Calculations	Registers 2 and 3 displays DSKY NUM/32	
31.	TTEST4 - Evaluation	The data recorded in step 28 agrees with the results of the Calculation of step 29 within ± 0.2 milliseconds.	
39.	TTEST1 - Start Check	DSKY Register 1 is 24-1, FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 8

JDC
NO. 05773
REV. F

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
40.	TTEST1 - Measurement	FREQUENCY COUNTER totals	
41.	TTEST1 - DSKY Displays	5120	
42.	TTEST1 - Evaluation	Results in steps 40 and 41 are within ±2 counts in the least significant counter position.	
50.	TTEST2 - Start Check	DSKY Register 1 is 24-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
51.	TTEST2 - Measurement	FREQUENCY COUNTER totals	
52.	TTEST2 - DSKY Displays	00010	
53.	TTEST2 - Evaluation	Results in steps 51 and 52 are within ±2 counts in the least significant counter position.	
61.	TTEST3 - Start Check	DSKY Register 1 is 24-3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
62.	TTEST3 - Measurement	FREQUENCY COUNTER totals	
63.	TTEST3 - DSKY Displays	5120	
64.	TTEST3 - Evaluation	Results in steps 62 and 63 are within ±2 counts in the least significant counter position.	

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EQUIPMENT TEST
DATA SHEET 3 OF 8

JDC
NO. 05773
REV. F

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
72.	TTEST5 - Start Check	DSKY Register 1 is 1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
73.	TTEST5 - Measurement	FREQUENCY COUNTER totals	
74.	TTEST5 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
75.	TTEST5 - Evaluation	Results in steps 73 and 74 are within ±2 counts in the least significant counter position.	
83.	TTEST6 - Start Check	DSKY Register 1 is 2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
84.	TTEST6 - Measurement	FREQUENCY COUNTER totals	
85.	TTEST6 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
86.	TTEST6 - Evaluation	Results in steps 84 and 85 are within ± 2 counts in the least significant counter position.	
94.	TTEST7 - Start Check	DSKY Register 1 is 3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
95.	TTEST7 - Measurement	FREQUENCY COUNTER totals	

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EQUIPMENT TEST
DATA SHEET 4 OF 8

JDC
NO. 05773
REV. F

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
96.	TTEST7 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
97.	TTEST7 - Evaluation	Results in steps 95 and 96 are within ±2 counts in the least significant counter position.	
105.	TTEST8 - Start Check	DSKY Register 1 is 4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
106.	TTEST8 - Measurement	FREQUENCY COUNTER totals	
107.	TTEST8 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
108.	TTEST8 - Evaluation	Results in steps 106 and 107 are within ±2 counts in the least significant counter position.	
116.	TTEST9 - Start Check	DSKY Register 1 is 5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
117.	TTEST9 - Measurement	FREQUENCY COUNTER totals	
118.	TTEST9 - DSKY Displays	Reg. 2 = 16383, Reg. 3 - 00000	
119.	TTEST9 - Evaluation	Results in steps 117 and 118 are within ±2 counts in the least significant counter position.	

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EQUIPMENT TEST
DATA SHEET 5 OF 8

JDC
NO. 05773
REV. F

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
128.	TTEST10 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
129.	TTEST10 - Measurement	FREQUENCY COUNTER totals	
130.	TTEST10 - DSKY Displays	Reg. 2 = 10239, Reg. 3 - 06000	
131.	TTEST10 - Evaluation	Results in steps 129 and 130 are within ±2 counts in the least significant counter position.	
139.	TTEST11 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
140.	TTEST11 - Measurement	FREQUENCY COUNTER totals	
141.	TTEST11 - DSKY Displays	Reg. 2 = 10239, Reg. 3 = 06000	
142.	TTEST11 - Evaluation	Results in steps 140 and 141 are within ±2 counts in the least significant counter position.	
151.	TTEST12 - Start Check	DSKY Register 1 is 3-4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
152.	TTEST12 - Measurement	FREQUENCY COUNTER totals	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 8

JDC
NO. 05773
REV. F

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
153.	TTEST12 - DSKY Displays	Reg. 2 = 07500, Reg. 3 = 00000	
154.	TTEST12 - Evaluation	Results in steps 152 and 153 are within ±2 counts in the least significant counter position.	
162.	TTEST13 - Start Check	DSKY Register 1 is 3-5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
163.	TTEST13 - Measurement	FREQUENCY COUNTER totals	
164.	TTEST13 - DSKY Displays	Reg. 2 = 05000, Reg. 3 = 00000	
165.	TTEST13 - Evaluation	Results in steps 163 and 164 are within ±2 counts in the least significant counter position.	
173.	TTEST14 - Start Check	DSKY Register 1 is 4-1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
174.	TTEST14 - Measurement	FREQUENCY COUNTER totals	
175.	TTEST14 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
176.	TTEST14 - Evaluation	Results in steps 174 and 175 are within ±2 counts in the least significant counter position.	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 8

JDC
NO. 05773
REV. F

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
184.	TTEST15 - Start Check	DSKY Register 1 is 4-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
185.	TTEST15 - Measurement	FREQUENCY COUNTER totals	
186.	TTEST15 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
187.	TTEST15 - Evaluation	Results in steps 185 and 186 are within ±2 counts in the least significant counter position.	
195.	TTEST16 - Start Check	DSKY Register 1 is 3-6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
196.	TTEST16 - Measurement	FREQUENCY COUNTER totals	
197.	TTEST16 - DSKY Displays	Reg. 2 = 03125, Reg. 3 = 00000	
198.	TTEST16 - Evaluation	Results in steps 196 and 197 are within ±2 counts in the least significant counter position.	
207.	WTEST Check No. 1	DSKY Register 1 is 8-1. DSKY Registers 2 and 3 are blank.	
210.	WTEST Check No. 2	DSKY Register 1 is 8-2 and Flashes twice. DSKY Registers 2 and 3 are blank.	

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RAYTHEON

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EQUIPMENT TEST
DATA SHEET 8 OF 8

JDC
NO. 05773
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JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
212.	WTEST Check No. 3	DSKY Register 1 is 8-3. DSKY Registers 2 and 3 are blank.	
213.	WTEST Check No. 4	DSKY Register 1 is 8-4. DSKY Registers 2 and 3 are 00016 and 00001 respectively.	
216.	WTEST Check No. 5	DSKY Register 1 is 8-5. DSKY Registers 2 and 3 are blank.	
220.	WTEST Check No. 6	DSKY Register 1 is 8-6. DSKY Registers 2 and 3 are blank. DSKY COMP ACTY is on.	
223.	WTEST Check No. 7	DSKY Register 1 is 8-7. DSKY Registers 2 and 3 are blank.	
228.	WTEST8 and Success Display	DSKY Register 1 is 8-8. DSKY Register 2 is 99999. DSKY Register 3 is 99999.	

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RAYTHEON

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

JDC 05773 REV. — PAGE 1 OF 20
INITIAL TDRR 32809 D.S P3S 8

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

Tests the outputs of both the High-order (Channel 3) and Low-order (Channel 4) scalers, along with Time Counters T2 through T6. E Memory retention in the Standby mode is checked during the scaler test. The last section of this test checks the operation of the warning alarm. A brief analysis is included as a preface to each specific test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414, 05403
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program TIME AND WARNING CHECKS Mylar Tape, JDC 05774

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the FREQUENCY COUNTER.

3. On the XY Interface Panel:

a. Set the CHANNEL T switches to position 211.

b. Press the LOAD CHAN T 200 OHMS switch to the on (illuminated) position.

c. Set the FREQ + PHASE switch to the FRT T →S position.

4. Prepare the CTS FREQUENCY COUNTER for operation as specified by JDC 05403, and verify that coaxial cables are present and connected as follows:

XY Interface Panel CNTR-A jack	to	A20 Panel CNTR A jack
Frequency Counter FREQ A - DC jack	to	A20 Panel CNTR A jack

5. On the FREQUENCY COUNTER set:
FUNCTION switch to FREQ A
FREQ-TIME switch to CPS
TRIGGER LEVEL vernier for display of 3200.

6. Set CHANNEL T switches to position 212.

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7. Set the FREQ - TIME switch to the MS scale-center position. Verify that the Display decimal point is located between the first and second least significant digits, i. e., 000000.0. Set the DISPLAY Control to the maximum clockwise position.

8. Load Program TIME AND WARNING CHECKS (JDC 05774) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

9. Rewind tape and verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).

10. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

TTEST4-PROGRAM ANALYSIS Loads E BANKS with CHECKERS. The external (FREQUENCY COUNTER) clock is triggered and Channels 3 and 4 are stored in location 0065 and 0066. The computer then waits for the operator to switch to Standby. After Standby an operator TC to 0373 will resume the program, storing the updated scaler count in locations 67 and 70, stopping the external Counter, and performing a CHECK SUM of E Memory CHECKERS. If the CHECKSUM is correct, program will subtract 0065 from 0067 and 0066 from 0070 and display the total difference in DSKY Register 2 and 3. In order to convert the DSKY count to milliseconds the operator must divide it by 32 out to 7 places. The quotient is then compared with the count displayed on the Frequency counter to verify scaler continuity during standby.

Continued

11. Transfer Control to Location 0250 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

12. Press the MONITOR indicator switch to the on (illuminated) position.

13. Press the CL Key.

14. Press the RESET button on the FREQUENCY COUNTER and Verify the display is zeroed.

15. Set the T12 COUNTER STOP switch to the OFF position.

16. Set the INHIBIT INCREMENTS switch to the OFF position.

17. Press the PROCEED button.

18. Let the computer run for approximately 10 seconds. Verify the conditions listed below are present by stamping data sheet.

a. FREQUENCY COUNTER is counting.

b. DSKY Register 1 displays 24-4.

c. DSKY Registers 2 and 3 are blank.

19. Set the T12 COUNTER STOP switch to the ON position.

20. Hold down the DSKY STBY Key until the STBY indicator illuminates and time the interval. (Indicator should illuminate within 2.00 seconds after the STBY Key has been depressed.)

21. Allow the computer to remain in the Standby mode for period longer than 3 minutes but less than 15 minutes. Record the amount of time spent in the Standby mode on the data sheet.

DATE

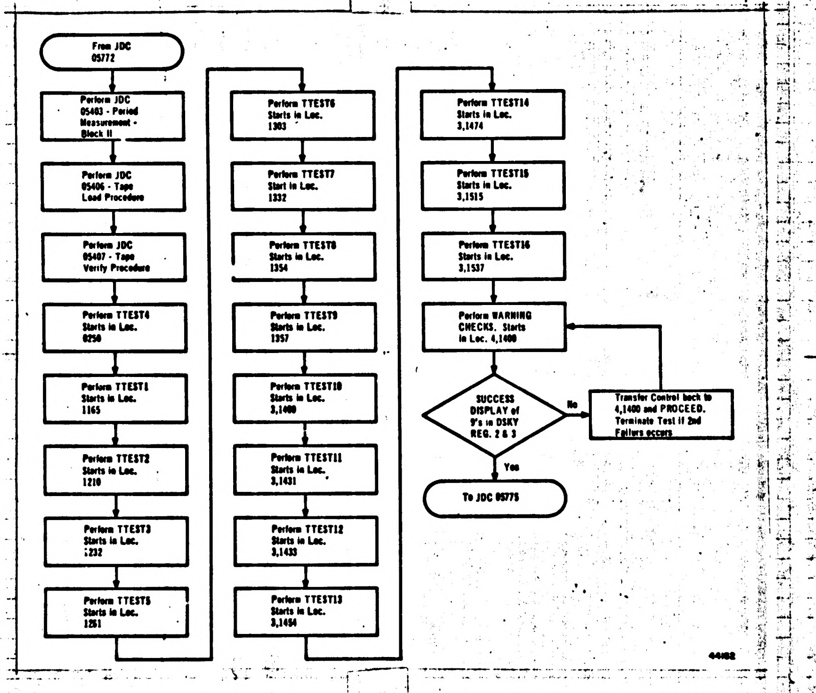
From JDC 05772
Perform JDC 05403 - Period Measurement - Block II
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 - Tape Verify Procedure
Perform TTEST4 Starts in Loc. 0250
Perform TTEST1 Starts in Loc. 1165
Perform TTEST2 Starts in Loc. 1210
Perform TTEST3 Starts in Loc. 1232
Perform TTEST5 Starts in Loc. 1261
Perform TTEST6 Starts in Loc. 1303
Perform TTEST7 Start in Loc. 1332
Perform TTEST8 Starts in Loc. 1354
Perform TTEST9 Starts in Loc. 1357
Perform TTEST10 Starts in Loc. 3,1400
Perform TTEST11 Starts in Loc. 3,1431
Perform TTEST12 Starts in Loc. 3,1433
Perform TTEST13 Starts in Loc. 3,1454
Perform TTEST14 Starts in Loc. 3,1474
Perform TTEST15 Starts in Loc. 3,1515
Perform TTEST16 Starts in Loc. 3,1537
Perform WARNING CHECKS. Starts in Loc. 4,1400
SUCCESS DISPLAY of 9's in DSKY REG. 2 & 3
No
Transfer Control back to 4,1400 and PROCEED. Terminate Test if 2nd Failure occurs
Yes
To JDC 05775
44182

Figure 1. Flowchart for Performing Program TIME AND WARNING CHECKS

DATE

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22. Hold down the DSKY STBY Key until the STBY indicator extinguishes. Stamp data sheet.

23. Transfer Control to Location 0373 using the procedures of JDC 05412.

24. Press the MONITOR indicator switch to the on (illuminated) position.

25. Press the CL Key.

26. Set the T12 COUNTER STOP switch to the OFF position.

27. Press the PROCEED button.

28. Verify that the FREQUENCY COUNTER stops counting and immediately record total count.

29. Verify that DSKY Registers 2 and 3 display a number (with a minimum of eight digits total). Record the number on the data sheet. Also divide the DSKY number by 32 and record results on the data sheet.

30. If the DSKY displays all 9's in Registers 2 and 3 the computer has failed the CHECKER BOARD CHECKSUM portion of this test. Proceed to step 7 of this procedure and perform all successive steps again. If the test fails again discontinue further testing.

31. Compare results of steps 28 and 29. Stamp data sheet.

TTEST1 - PROGRAM ANALYSIS

This test segment checks the time required for Channel 4 to count from zero, to full scale. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-1 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER.) The program then re-enters the same Channel 4 full scale check subroutine described above. Immediately after Channel 4 increments through zero again, the program retriggers the external clock, halts the time counter, and sets up the number 5120 in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement with ± 2 counts in the least significant position.

32. Set the T12 COUNTER STOP switch to the ON position.

33. Transfer Control to Location 1165 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

34. Press the MONITOR indicator switch to the on (illuminated) position.

35. Press the CL Key.

36. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

37. Set the T12 COUNTER STOP switch to the OFF position.

38. Press the PROCEED button.

DATE

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-TIME AND WARNING CHECKS

JDC 05773 REV. — PAGE 1 OF 20
INITIAL TDRR 32809 D.S. P3S 8

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

Tests the outputs of both the High-order (Channel 3) and Low-order (Channel 4) scalers, along with Time Counters T2 through T6. E Memory retention in the Standby mode is checked during the scaler test. The last section of this test checks the operation of the warning alarm. A brief analysis is included as a preface to each specific test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414, 05403
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program TIME AND WARNING CHECKS Mylar Tape, JDC 05774

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the FREQUENCY COUNTER.

3. On the XY Interface Panel:

a. Set the CHANNEL T switches to position 211.

b. Press the LOAD CHAN T 200 OHMS switch to the on (illuminated) position.

c. Set the FREQ + PHASE switch to the FRT T →S position.

4. Prepare the CTS FREQUENCY COUNTER for operation as specified by JDC 05403, and verify that coaxial cables are present and connected as follows:

XY Interface Panel CNTR-A jack	to	A20 Panel CNTR A jack
Frequency Counter FREQ A - DC jack	to	A20 Panel CNTR A jack

5. On the FREQUENCY COUNTER set:
FUNCTION switch to FREQ A
FREQ-TIME switch to CPS
TRIGGER LEVEL vernier for display of 3200.

6. Set CHANNEL T switches to position 212.

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7. Set the FREQ - TIME switch to the MS scale-center position. Verify that the Display decimal point is located between the first and second least significant digits, i. e., 000000. 0. Set the DISPLAY Control to the maximum clockwise position.

8. Load Program TIME AND WARNING CHECKS (JDC 05774) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

9. Rewind tape and verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).

10. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

TTEST4-PROGRAM ANALYSIS Loads E BANKS with CHECKERS. The external (FREQUENCY COUNTER) clock is triggered and Channels 3 and 4 are stored in location 0065 and 0066. The computer then waits for the operator to switch to Standby. After Standby an operator TC to 0373 will resume the program, storing the updated scaler count in locations 67 and 70, stopping the external Counter, and performing a CHECK SUM of E Memory CHECKERS. If the CHECKSUM is correct, program will subtract 0065 from 0067 and 0066 from 0070 and display the total difference in DSKY Register 2 and 3. In order to convert the DSKY count to milliseconds the operator must divide it by 32 out to 7 places. The quotient is then compared with the count displayed on the Frequency counter to verify scaler continuity during standby.

11. Transfer Control to Location 0250 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

12. Press the MONITOR indicator switch to the on (illuminated) position.

13. Press the CL Key.

14. Press the RESET button on the FREQUENCY COUNTER and Verify the display is zeroed.

15. Set the T12 COUNTER STOP switch to the OFF position.

16. Set the INHIBIT INCREMENTS switch to the OFF position.

17. Press the PROCEED button.

18. Let the computer run for approximately 10 seconds. Verify the conditions listed below are present by stamping data sheet.

a. FREQUENCY COUNTER is counting.

b. DSKY Register 1 displays 24-4.

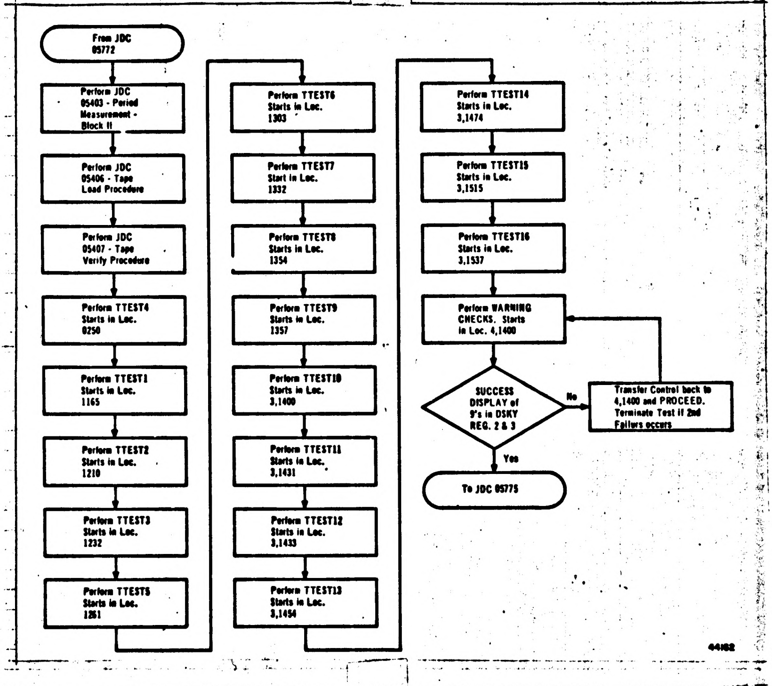
c. DSKY Registers 2 and 3 are blank.

19. Set the T12 COUNTER STOP switch to the ON position.

20. Hold down the DSKY STBY Key until the STBY indicator illuminates and time the interval. (Indicator should illuminate within 2. 00 seconds after the STBY Key has been depressed.)

21. Allow the computer to remain in the Standby mode for period longer than 3 minutes but less than 15 minutes. Record the amount of time spent in the Standby mode on the data sheet.

DATE ______


From JDC 05772
Perform JDC 05403 - Period Measurement - Block II
Perform JDC 05406 - Tape Load Procedure
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Perform TTEST4 Starts in Loc. 0250
Perform TTEST1 Starts in Loc. 1165
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Perform TTEST5 Starts in Loc. 1261
Perform TTEST6 Starts in Loc. 1303
Perform TTEST7 Start in Loc. 1332
Perform TTEST8 Starts in Loc. 1354
Perform TTEST9 Starts in Loc. 1357
Perform TTEST10 Starts in Loc. 3,1400
Perform TTEST11 Starts in Loc. 3,1431
Perform TTEST12 Starts in Loc. 3,1433
Perform TTEST13 Starts in Loc. 3,1454
Perform TTEST14 Starts in Loc. 3,1474
Perform TTEST15 Starts in Loc. 3,1515
Perform TTEST16 Starts in Loc. 3,1537
Perform WARNING CHECKS. Starts in Loc. 4,1400
SUCCESS DISPLAY of 9's in DSKY REG. 2 & 3
No
Transfer Control back to 4,1400 and PROCEED. Terminate Test if 2nd Failure occurs
Yes
To JDC 05775
44162

Figure 1. Flowchart for Performing Program TIME AND WARNING CHECKS

DATE ______

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22. Hold down the DSKY STBY Key until the STBY indicator extinguishes. Stamp data sheet.

23. Transfer Control to Location 0373 using the procedures of JDC 05412.

24. Press the MONITOR indicator switch to the on (illuminated) position.

25. Press the CL Key.

26. Set the T12 COUNTER STOP switch to the OFF position.

27. Press the PROCEED button.

28. Verify that the FREQUENCY COUNTER stops counting and immediately record total count.

29. Verify that DSKY Registers 2 and 3 display a number (with a minimum of eight digits total). Record the number on the data sheet. Also divide the DSKY number by 32 and record results on the data sheet.

30. If the DSKY displays all 9's in Registers 2 and 3 the computer has failed the CHECKER BOARD CHECKSUM portion of this test. Proceed to step 7 of this procedure and perform all successive steps again. If the test fails again discontinue further testing.

31. Compare results of steps 28 and 29. Stamp data sheet.

TTEST1 - PROGRAM ANALYSIS

This test segment checks the time required for Channel 4 to count from zero, to full scale. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-1 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER.) The program then re-enters the same Channel 4 full scale check subroutine described above. Immediately after Channel 4 increments through zero again, the program retriggers the external clock, halts the time counter, and sets up the number 5120 in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement with ± 2 counts in the least significant position.

32. Set the T12 COUNTER STOP switch to the ON position.

33. Transfer Control to Location 1165 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

34. Press the MONITOR indicator switch to the on (illuminated) position.

35. Press the CL Key.

36. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

37. Set the T12 COUNTER STOP switch to the OFF position.

38. Press the PROCEED button.

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39. Verify the following events:

a. DSKY Register 1 displays 24-1.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

40. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

41. Verify that the DSKY Register 2 Displays 5120. Stamp data sheet.

42. Verify that the number displayed on the FREQUENCY COUNTER equals the DSKY number 5120 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST2 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 4 to count from zero to 32. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-2 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). The program then reenters the same Channel 4 full scale check subroutine described above, except that an octal 37 is used for a constant in place of the full scale constant. (Octal 37 is equal to decimal 31.) Immediately after Channel 4 reaches the 32nd count, the program retriggers the external clock, halts the time counter, and sets up the number 10 (00010) in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (00010) by the DSKY and verifying agreement within ±2 counts in the least significant position.

43. Set the T12 COUNTER STOP switch to the ON position.

44. Transfer Control to Location 1210 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

45. Press the MONITOR indicator switch to the on (illuminated) position.

46. Press the CL Key.

47. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

48. Set the T12 COUNTER STOP switch to the OFF position.

49. Press the PROCEED button.

50. Verify the following events:

a. DSKY Register 1 displays 24-2.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

51. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

52. Verify that the DSKY Register 2 displays 00010. Stamp data sheet.

53. Verify the number displayed on the FREQUENCY COUNTER equals the DSKY number (00010) within ±2 counts in the least significant counter position. Stamp data sheet.

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TTEST3 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 3 to increment once. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-3 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). After activating the FREQUENCY COUNTER the program sets up the number 5120 in DSKY display Register 2. The program then stores the contents of Channel 3 into Register L and enters a negative 1 into location 0075 to be indexed later. The program enters a subroutine monitoring the state of Channel 3. This subroutine is similar to the one described above except that the RXOR instruction is transformed to RXOR Channel 3 (instead of 4) by the -1 in the Index location. As soon as a difference is detected in the value of Channel 3 (caused by an increment pulse) the program will retrigger the external clock halting the time measurement. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement within ±2 counts in the least significant position.

54. Set the T12 COUNTER STOP switch to the ON position.

55. Transfer Control to Location 1232 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

56. Press the MONITOR indicator switch to the on (illuminated) position.

57. Press the CL Key.

58. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

59. Set the T12 COUNTER STOP switch to the OFF position.

60. Press the PROCEED button.

61. Verify the following events:

a. DSKY Register 1 displays 24-3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

62. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

63. Verify that the DSKY Register 2 displays 5120. Stamp data sheet.

64. Verify that the number displayed on the number (5120) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST5 - PROGRAM ANALYSIS

The program routines comprising Time Test 5 are designed to measure the time required for the TIME 1 Counter to count from 1, through full scale, and back to zero. The TTEST5 programmed test functions and executed in the order listed below.

a. Clears the DSKY Registers and displays the number 1 in position 3 of DSKY Register 1.

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b. Deposits zeros in location 0025 (TIME 1 Counter) and sample loops 0025 for the first count (or a count of 1).

c. Detecting a count of 1, the program will switch to a subroutine to start the external clock (FREQUENCY COUNTER). After starting the external clock the program returns to a sample loop, this time testing for a positive zero condition in 0025.

d. Detecting that 0025 is positive zero, the program switches to a subroutine to stop the external clock. The program then enters a display routine which places the number 16383 in DSKY Register 2, and 00000 in DSKY Register 3. The DSKY displays (Registers 2 and 3) are read as one number, 163,830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

65. Set the T12 COUNTER STOP switch to the ON position.

66. Transfer Control to Location 1261 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

67. Press the MONITOR indicator switch to the on (illuminated) position.

68. Press the CL Key.

69. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

70. Set the T12 COUNTER STOP switch to the OFF position.

71. Press the PROCEED button.

72. Verify the following events:

a. DSKY Register 1 displays a 1 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

73. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

74. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

75. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST6 - PROGRAM ANALYSIS

The program routines comprising Time Test 6 are designed to measure the time required for the TIME2 Counter to count from 1, through full scale, and back to zero. The TTEST6 programmed test functions are executed in the order described below.

a. Clears the DSKY Registers and displays the number 2 in position 3 of DSKY Register 1.

b. Starts the external clock (FREQUENCY COUNTER) immediately after the next transition of the TIME 1 counter.

c. Deposits a count of 1 into the TIME 2 Counter.

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d. Deposits a positive full scale (37777) number into the TIME 1 counter.

e. Enters a sample loop through TIME 1, waiting for the TIME 1 Counter to increment from full scale to zero. This transition indicates that the TIME 2 Counter has been incremented.

f. When the TIME 1 Counter switches to zero, the program will check the TIME 2 Counter for a positive zero condition. If positive zero is not present in the TIME 2 Counter, the program will form a jump loop cycling through the functions described in d and e above, until such time as the TIME 2 Counter is finally incremented back to zero.

g. When a positive zero condition is detected (approximately 163,830 milliseconds later) in the TIME 2 Counter, the program will continue on, first halting the FREQUENCY COUNTER and then entering the DSKY display routine. The DSKY displays (registers 2 and 3) are read as one number, 163,830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

76. Set the T12 COUNTER STOP switch to the ON position.

77. Transfer Control to Location 1303 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

78. Press the MONITOR indicator switch to the on (illuminated) position.

79. Press the CL Key.

80. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

81. Set the T12 COUNTER STOP switch to the OFF position.

82. Press the PROCEED button.

83. Verify the following events:

a. DSKY Register 1 displays a 2 in position 3.

b. The FREQUENCY COUNTER IS counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

84. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

85. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

86. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST7, 8, and 9 - PROGRAM ANALYSIS

TTEST7 measures the time required to increment the TIME 3 Counter from 1, through full scale, and back to zero. TTEST8 measures the time required to increment the TIME 4 Counter from 1, through fully scale, and back to zero. TTEST9 measures the time required to increment the TIME 5 Counter from 1, through full scale, and back to zero. When performing these combined tests the operational sequence starts with Time Test 7 (location 1332), and after the results are displayed the program is continued by a manual Transfer of Control to location 1354 (Time Test 8). After obtaining the results of this test, the program is continued by another manual Transfer of Control to location 1357 for Time Test 9.

DATE ________

39. Verify the following events:

a. DSKY Register 1 displays 24-1.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

40. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

41. Verify that the DSKY Register 2 Displays 5120. Stamp data sheet.

42. Verify that the number displayed on the FREQUENCY COUNTER equals the DSKY number 5120 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST2 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 4 to count from zero to 32. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-2 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). The program then reenters the same Channel 4 full scale check subroutine described above, except that an octal 37 is used for a constant in place of the full scale constant. (Octal 37 is equal to decimal 31.) Immediately after Channel 4 reaches the 32nd count, the program retriggers the external clock, halts the time counter, and sets up the number 10 (00010) in DSKY display Register 2. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (00010) by the DSKY and verifying agreement within ±2 counts in the least significant position.

43. Set the T12 COUNTER STOP switch to the ON position.

44. Transfer Control to Location 1210 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

45. Press the MONITOR indicator switch to the on (illuminated) position.

46. Press the CL Key.

47. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

48. Set the T12 COUNTER STOP switch to the OFF position.

49. Press the PROCEED button.

50. Verify the following events:

a. DSKY Register 1 displays 24-2.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

51. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

52. Verify that the DSKY Register 2 displays 00010. Stamp data sheet.

53. Verify the number displayed on the FREQUENCY COUNTER equals the DSKY number (00010) within ±2 counts in the least significant counter position. Stamp data sheet.

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TTEST3 - PROGRAM ANALYSIS

This test segment measures the time required for Channel 3 to increment once. Prior to the start of the actual time check, the program clears out the DSKY display and displays 24-3 in DSKY Register 1 to identify the test segment being performed. The program then enters a subroutine which monitors Channel 4 for a full scale reading. Immediately after Channel 4 increments from zero the program triggers the external clock (FREQUENCY COUNTER). After activating the FREQUENCY COUNTER the program sets up the number 5120 in DSKY display Register 2. The program then stores the contents of Channel 3 into Register L and enters a negative 1 into location 0075 to be indexed later. The program enters a subroutine monitoring the state of Channel 3. This subroutine is similar to the one described above except that the RXOR instruction is transformed to RXOR Channel 3 (instead of 4) by the -1 in the index location. As soon as a difference is detected in the value of Channel 3 (caused by an increment pulse) the program will retrigger the external clock halting the time measurement. The test segment is concluded by the operator comparing the amount of elapsed time displayed on the FREQUENCY COUNTER with the number displayed (5120) by the DSKY and verifying agreement within ±2 counts in the least significant position.

54. Set the T12 COUNTER STOP switch to the ON position.

55. Transfer Control to Location 1232 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

56. Press the MONITOR indicator switch to the on (illuminated) position.

57. Press the CL Key.

58. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

59. Set the T12 COUNTER STOP switch to the OFF position.

60. Press the PROCEED button.

61. Verify the following events:

a. DSKY Register 1 displays 24-3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

62. Verify that the FREQUENCY COUNTER has stopped counting and record the number displayed on the data sheet.

63. Verify that the DSKY Register 2 displays 5120. Stamp data sheet.

64. Verify that the number displayed on the number (5120) within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST5 - PROGRAM ANALYSIS

The program routines comprising Time Test 5 are designed to measure the time required for the TIME 1 Counter to count from 1, through full scale, and back to zero. The TTEST5 programmed test functions and executed in the order listed below.

a. Clears the DSKY Registers and displays the number 1 in position 3 of DSKY Register 1.

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b. Deposits zeros in location 0025 (TIME 1 Counter) and sample loops 0025 for the first count (or a count of 1).

c. Detecting a count of 1, the program will switch to a subroutine to start the external clock (FREQUENCY COUNTER). After starting the external clock the program returns to a sample loop, this time testing for a positive zero condition in 0025.

d. Detecting that 0025 is positive zero, the program switches to a subroutine to stop the external clock. The program then enters a display routine which places the number 16383 in DSKY Register 2, and 00000 in DSKY Register 3. The DSKY displays (Registers 2 and 3) are read as one number, 163, 830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

65. Set the T12 COUNTER STOP switch to the ON position.

66. Transfer Control to Location 1261 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

67. Press the MONITOR indicator switch to the on (illuminated) position.

68. Press the CL Key.

69. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

70. Set the T12 COUNTER STOP switch to the OFF position.

71. Press the PROCEED button.

72. Verify the following events:

a. DSKY Register 1 displays a 1 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

73. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

74. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

75. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 with n ±2 counts in the least significant counter position. Stamp data sheet.

TTEST6 - PROGRAM ANALYSIS

The program routines comprising Time Test 6 are designed to measure the time required for the TIME 2 Counter to count from 1, through full scale, and back to zero. The TTEST6 programmed test functions are executed in the order described below.

a. Clears the DSKY Registers and displays the number 2 in position 3 of DSKY Register 1.

b. Starts the external clock (FREQUENCY COUNTER) immediately after the next transition of the TIME 1 counter.

c. Deposits a count of 1 into the TIME 2 Counter.

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d. Deposits a positive full scale (37777) number into the TIME 1 counter.

e. Enters a sample loop through TIME 1, waiting for the TIME 1 Counter to increment from full scale to zero. This transition indicates that the TIME 2 Counter has been incremented.

f. When the TIME 1 Counter switches to zero, the program will check the TIME 2 Counter for a positive zero condition. If positive zero is not present in the TIME 2 Counter, the program will form a jump loop cycling through the functions described in d and e above, until such time as the TIME 2 Counter is finally incremented back to zero.

g. When a positive zero condition is detected (approximately 163, 830 milliseconds later) in the TIME 2 Counter, the program will continue on, first halting the FREQUENCY COUNTER and then entering the DSKY display routine. The DSKY displays (registers 2 and 3) are read as one number, 163, 830. This number is compared with the amount of time measured by the FREQUENCY COUNTER for agreement within ±2 counts in the least significant Counter position.

76. Set the T12 COUNTER STOP switch to the ON position.

77. Transfer Control to Location 1303 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

78. Press the MONITOR indicator switch to the on (illuminated) position.

79. Press the CL Key.

80. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

81. Set the T12 COUNTER STOP switch to the OFF position.

82. Press the PROCEED button.

83. Verify the following events:

a. DSKY Register 1 displays a 2 in position 3.

b. The FREQUENCY COUNTER IS counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

84. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

85. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

86. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830.0 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST7, 8, and 9 - PROGRAM ANALYSIS

TTEST7 measures the time required to increment the TIME 3 Counter from 1, through full scale, and back to zero. TTEST8 measures the time required to increment the TIME 4 Counter from 1, through fully scale, and back to zero. TTEST9 measures the time required to increment the TIME 5 Counter from 1, through full scale, and back to zero. When performing these combined tests the operational sequence starts with Time Test 7 (location 1332), and after the results are displayed the program is continued by a manual Transfer of Control to location 1354 (Time Test 8). After obtaining the results of this test, the program is continued by another manual Transfer of Control to location 1357 for Time Test 9.

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All three tests utilize a common routine which clears the DSKY display, starts the external counter after 1 is detected in the TIME Counter being tested, stops the external counter after zero is detected in the TIME Counter under test, and displays the specified elapsed time in DSKY Registers 2 and 3. The common routine is tied into each test by initialization procedures which set the Index location to a value that will produce the proper counter address according to the Time Test being performed. The programmed functions of the common routine are executed in the order described below.

a. Clears the DSKY Registers and displays the test number in position 3 of DSKY Register 1. (Displays 3 for TTEST7, 4 for TTEST8, and 5 for TTEST9.)

b. Deposits positive zero into the TIME Counter under test.

c. Starts the external clock (FREQUENCY COUNTER) immediately after the TIME Counter increments to a count of 1.

d. Enters a sample loop through the TIME Counter location, and looks for a positive zero condition in the TIME Counter.

e. When the TIME Counter reaches positive zero, the program halts the external clock, and enters the DSKY display routine. The DSKY displays (Register 2 and 3) are read as one number 163, 830. This number will be displayed at the end of each Time Test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

87. Set the T12 COUNTER STOP switch to the ON position.

88. Transfer Control to Location 1332 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

89. Press the MONITOR indicator switch to the on (illuminated) position.

90. Press the CL Key.

91. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

92. Set the T12 COUNTER STOP switch to the OFF position.

93. Press the PROCEED button.

94. Verify the following events:

a. DSKY Register 1 displays a 3 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

95. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

96. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

97. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830. 0 within ±2 counts in the least significant counter position. Stamp data sheet.

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98. Set the T12 COUNTER STOP switch to the ON position.

99. Transfer Control to Location 1354 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

100. Press the MONITOR indicator switch to the on (illuminated) position.

101. Press the CL Key.

102. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

103. Set the T12 COUNTER STOP switch to the OFF position.

104. Press the PROCEED button.

105. Verify the following events:

a. DSKY Register 1 displays a 4 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

106. Verify the the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

107. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

108. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830. 0 within ±2 counts in the least significant counter position. Stamp data sheet.

109. Set the T12 COUNTER STOP switch to the ON position.

110. Transfer Control to Location 1357 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

111. Press the MONITOR indicator switch to the on (illuminated) position.

112. Press the CL Key.

113. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

114. Set the T12 COUNTER STOP switch to the OFF position.

115. Press the PROCEED button.

116. Verify the following events:

a. DSKY Register 1 displays a 5 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

117. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

118. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

119. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830. 0 within ±2 counts in the least significant counter position. Stamp data sheet.

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TTEST10 AND 11 - PROGRAM ANALYSIS

TTEST10 measures the time required to decrement the TIME 6 Counter from positive full scale to minus zero. TTEST11 measures the time required to decrement the TIME 6 Counter from full scale to minus zero. The elapsed time measured should result in 10. 23906 seconds in both tests. Both tests utilize a common routine to clear the DSKY display, set the TIME 3 Counter set Bit 16 of Channel 13, start the external counter, monitor TIME 6 for a minus zero, and stop the external counter. When performing these tests, the operational sequence starts with Time Test 10 (location 3, 1400) and stops when the results are displayed in DSKY Registers 2 and 3. The operator continues the program by Transferring Control to Time Test 11 (location 3, 1431). The program also stops on this test when the results are displayed in DSKY Registers 2 and 3. Between the two tests only the initialization procedures are different. During the initialization of Time Test 10, the TIME 6 counter is loaded with a positive full scale number. During the initialization of Time Test 11, the TIME 6 counter is loaded with a negative full scale number. The programmed functions of the routine common to both tests are executed in the order described below.

a. Deposits number (Positive Full Scale for TTEST10 and Negative Full Scale for TTEST11) into the TIME 6 Counter (location 0031).

b. Clears the DSKY Registers and displays the number 6 in position 3 of DSKY Register 1.

c. Sets a Positive Full Scale number into the TIME 3 Counter and CCS loops TIME 3 sampling for an increment back to zero.

d. After TIME 3 increments to zero, the program sets the Enable T6 Rupt (Bit 15, Channel 13) and starts the external counter (FREQUENCY COUNTER).

e. Enters a CCS loop through the TIME Counter location sampling for a minus zero.

f. Stops the external counter immediately after TIME 6 switches to minus zero and displays the number 10239 in DSKY Register 2 and 06000 in DSKY Register 3. This number will be displayed at the end of each test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement with ± 2 counts in the least significant counter position.

120. Set the FREQUENCY COUNTER FREQ-TIME switch to the third MS position. Verify that the decimal point is positioned between the second and third least significant counter digits, i.e., 00000.00.

121. Set the T12 COUNTER STOP switch to the ON position.

122. Transfer Control to Bank 3, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

123. Press the MONITOR indicator switch to the on (illuminated) position.

124. Press the CL Key.

125. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

126. Set the T12 COUNTER STOP switch to the OFF position.

127. Press the PROCEED button.

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128. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

129. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

130. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

131. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 10239. 06 milliseconds within ±2 counts in the least significant counter position. Stamp data sheet.

132. Set the T12 COUNTER STOP switch to the ON position.

133. Transfer Control to Bank 3, location 1431 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

134. Press the MONITOR indicator switch to the on (illuminated) position.

135. Press the CL Key.

136. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

137. Set the T12 COUNTER STOP switch to the OFF position.

138. Press the PROCEED button.

139. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

140. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

141. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

142. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count 10239. 06 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST12 - PROGRAM ANALYSIS

TTEST12 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 4. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-4 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

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All three tests utilize a common routine which clears the DSKY display, starts the external counter after 1 is detected in the TIME Counter being tested, stops the external counter after zero is detected in the TIME Counter under test, and displays the specified elapsed time in DSKY Registers 2 and 3. The common routine is tied into each test by initialization procedures which set the Index location to a value that will produce the proper counter address according to the Time Test being performed. The programmed functions of the common routine are executed in the order described below.

a. Clears the DSKY Registers and displays the test number in position 3 of DSKY Register 1. (Displays 3 for TTEST7, 4 for TTEST8, and 5 for TTEST9.)

b. Deposits positive zero into the TIME Counter under test.

c. Starts the external clock (FREQUENCY COUNTER) immediately after the TIME Counter increments to a count of 1.

d. Enters a sample loop through the TIME Counter location, and looks for a positive zero condition in the TIME Counter.

e. When the TIME Counter reaches positive zero, the program halts the external clock, and enters the DSKY display routine. The DSKY displays (Register 2 and 3) are read as one number 163, 830. This number will be displayed at the end of each Time Test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

87. Set the T12 COUNTER STOP switch to the ON position.

88. Transfer Control to Location 1332 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

89. Press the MONITOR indicator switch to the on (illuminated) position.

90. Press the CL Key.

91. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

92. Set the T12 COUNTER STOP switch to the OFF position.

93. Press the PROCEED button.

94. Verify the following events:

a. DSKY Register 1 displays a 3 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

95. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

96. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

97. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830. 0 within ±2 counts in the least significant counter position. Stamp data sheet.

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98. Set the T12 COUNTER STOP switch to the ON position.

99. Transfer Control to Location 1354 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

100. Press the MONITOR indicator switch to the on (illuminated) position.

101. Press the CL Key.

102. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

103. Set the T12 COUNTER STOP switch to the OFF position.

104. Press the PROCEED button.

105. Verify the following events:

a. DSKY Register 1 displays a 4 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

106. Verify the the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

107. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

108. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830. 0 within ±2 counts in the least significant counter position. Stamp data sheet.

109. Set the T12 COUNTER STOP switch to the ON position.

110. Transfer Control to Location 1357 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

111. Press the MONITOR indicator switch to the on (illuminated) position.

112. Press the CL Key.

113. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

114. Set the T12 COUNTER STOP switch to the OFF position.

115. Press the PROCEED button.

116. Verify the following events:

a. DSKY Register 1 displays a 5 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

117. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

118. Verify that DSKY Register 2 displays 16383 with 00000 in DSKY Register 3. Stamp data sheet.

119. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 163830. 0 within ±2 counts in the least significant counter position. Stamp data sheet.

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TTEST10 AND 11 - PROGRAM ANALYSIS

TTEST10 measures the time required to decrement the TIME 6 Counter from positive full scale to minus zero. TTEST11 measures the time required to decrement the TIME 6 Counter from full scale to minus zero. The elapsed time measured should result in 10. 23906 seconds in both tests. Both tests utilize a common routine to clear the DSKY display, set the TIME 3 Counter set Bit 16 of Channel 13, start the external counter, monitor TIME 6 for a minus zero, and stop the external counter. When performing these tests, the operational sequence starts with Time Test 10 (location 3, 1400) and stops when the results are displayed in DSKY Registers 2 and 3. The operator continues the program by Transferring Control to Time Test 11 (location 3, 1431). The program also stops on this test when the results are displayed in DSKY Registers 2 and 3. Between the two tests only the initialization procedures are different. During the initialization of Time Test 10, the TIME 6 counter is loaded with a positive full scale number. During the initialization of Time Test 11, the TIME 6 counter is loaded with a negative full scale number. The programmed functions of the routine common to both tests are executed in the order described below.

a. Deposits number (Positive Full Scale for TTEST10 and Negative Full Scale for TTEST11) into the TIME 6 Counter (location 0031).

b. Clears the DSKY Registers and displays the number 6 in position 3 of DSKY Register 1.

c. Sets a Positive Full Scale number into the TIME 3 Counter and CCS loops TIME 3 sampling for an increment back to zero.

d. After TIME 3 increments to zero, the program sets the Enable T6 Rupt (Bit 15, Channel 13) and starts the external counter (FREQUENCY COUNTER).

e. Enters a CCS loop through the TIME Counter location sampling for a minus zero.

f. Stops the external counter immediately after TIME 6 switches to minus zero and displays the number 10239 in DSKY Register 2 and 06000 in DSKY Register 3. This number will be displayed at the end of each test, and is compared with the time measurement displayed on the FREQUENCY COUNTER for agreement with ± 2 counts in the least significant counter position.

120. Set the FREQUENCY COUNTER FREQ-TIME switch to the third MS position. Verify that the decimal point is positioned between the second and third least significant counter digits, i.e., 00000.00.

121. Set the T12 COUNTER STOP switch to the ON position.

122. Transfer Control to Bank 3, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

123. Press the MONITOR indicator switch to the on (illuminated) position.

124. Press the CL Key.

125. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

126. Set the T12 COUNTER STOP switch to the OFF position.

127. Press the PROCEED button.

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128. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

129. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

130. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

131. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 10239. 06 milliseconds within ±2 counts in the least significant counter position. Stamp data sheet.

132. Set the T12 COUNTER STOP switch to the ON position.

133. Transfer Control to Bank 3, location 1431 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

134. Press the MONITOR indicator switch to the on (illuminated) position.

135. Press the CL Key.

136. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

137. Set the T12 COUNTER STOP switch to the OFF position.

138. Press the PROCEED button.

139. Verify the following events:

a. DSKY Register 1 displays a 6 in position 3.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

140. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

141. Verify that DSKY Register 2 displays 10239 with 06000 in DSKY Register 3. Stamp data sheet.

142. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count 10239. 06 within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST12 - PROGRAM ANALYSIS

TTEST12 measures the amount of time that elapses between the incrementing of TIME3 and TIME 4. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-4 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

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d. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 4 switches to zero and displays the number 07500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

143. Set the FREQUENCY COUNTER FREQ-TIME switch to the first µs position.

144. Set the T12 COUNTER STOP switch to the ON position.

145. Transfer Control to Bank 3 location 1433 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

146. Press the MONITOR indicator switch to the on (illuminated) position.

147. Press the CL Key.

148. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

149. Set the T12 COUNTER STOP switch to the OFF position.

150. Press the PROCEED button.

151. Verify the following events:

a. DSKY Register 1 displays 3-4 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

152. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

153. Verify that DSKY Register 2 displays 07500 with 00000 in DSKY Register 3. Stamp data sheet.

154. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 7500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST13 - PROGRAM ANALYSIS

TTEST13 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 5. The programmed functions of the test routine are in the order described below.

a. Clears the DSKY display and displays 3-5 in DSKY Register 1 positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 5 Counter and enters a CCS loop through the TIME 5 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 5 switches to zero and displays the number 05000 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

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155. Set the T12 COUNTER STOP switch to the ON position.

156. Transfer Control to Bank 3, location 1454 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

157. Press the MONITOR indicator switch to the on (illuminated) position.

158. Press the CL Key.

159. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

160. Set the T12 COUNTER STOP switch to the OFF position.

161. Press the PROCEED button.

162. Verify the following events:

a. DSKY Register 1 displays 3-5 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

163. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

164. Verify that DSKY Register 2 displays 05000 with 00000 in DSKY Register 3. Stamp data sheet.

165. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 5000 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST14 - PROGRAM ANALYSIS

TTEST14 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 1. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-1 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 1 Counter and enters a CCS loop through the TIME 1 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 1 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

166. Set the T12 COUNTER STOP switch to the ON position.

167. Transfer Control to Bank 3, location 1474 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

168. Press the MONITOR indicator switch to the on (illuminated) position.

169. Press the CL Key.

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170. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

171. Set the T12 COUNTER STOP switch to the OFF position.

172. Press the PROCEED button.

173. Verify the following events:

a. DSKY Register 1 displays 4-1 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

174. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

175. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

176. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST15 - PROGRAM ANALYSIS

TTEST15 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 2. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-2 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 2 Counter and enters a CCS loop through the TIME 2 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 2 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

177. Set the T12 COUNTER STOP switch to the ON position.

178. Transfer Control to Bank 3, location 1515 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

179. Press the MONITOR indicator switch to the on (illuminated) position.

180. Press the CL Key.

181. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

182. Set the T12 COUNTER STOP switch to the OFF position.

183. Press the PROCEED button.

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184. Verify the following events:

a. DSKY Register 1 display 4-2 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

185. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

186. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

187. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST16 - PROGRAM ANALYSIS

TTEST16 measures the time elapse (phase) between the incrementing of TIME 3 and TIME 6. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-6 in DSKY Register 1, positions 2 through 4.

b. Deposits a Negative Full Scale number into the TIME 6 Counter and enables the T6 Rupt (Bit 16 of Channel 13).

c. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

d. After TIME 3 changes to zero, the program starts the external counter (FREQUENCY COUNTER) and inserts a 1 into the TIME 6 Counter.

e. Samples the TIME 6 Counter for a negative zero condition, and after detecting this condition, stops the external counter.

f. Displays the number 03125 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

188. Set the T12 COUNTER STOP switch to the ON position.

189. Transfer Control to Bank 3, location 1537 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

190. Press the MONITOR indicator switch to the on (illuminated) position.

191. Press the CL Key.

192. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

193. Set the T12 COUNTER STOP switch to the OFF position.

194. Press the PROCEED button.

195. Verify the following events:

a. DSKY Register 1 displays 3-6 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

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d. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 4 switches to zero and displays the number 07500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

143. Set the FREQUENCY COUNTER FREQ-TIME switch to the first µs position.

144. Set the T12 COUNTER STOP switch to the ON position.

145. Transfer Control to Bank 3 location 1433 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

146. Press the MONITOR indicator switch to the on (illuminated) position.

147. Press the CL Key.

148. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

149. Set the T12 COUNTER STOP switch to the OFF position.

150. Press the PROCEED button.

151. Verify the following events:

a. DSKY Register 1 displays 3-4 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

152. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

153. Verify that DSKY Register 2 displays 07500 with 00000 in DSKY Register 3. Stamp data sheet.

154. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 7500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST13 - PROGRAM ANALYSIS

TTEST13 measures the amount of time that elapses between the incrementing of TIME 3 and TIME 5. The programmed functions of the test routine are in the order described below.

a. Clears the DSKY display and displays 3-5 in DSKY Register 1 positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

c. After TIME 3 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 5 Counter and enters a CCS loop through the TIME 5 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 5 switches to zero and displays the number 05000 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

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155. Set the T12 COUNTER STOP switch to the ON position.

156. Transfer Control to Bank 3, location 1454 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

157. Press the MONITOR indicator switch to the on (illuminated) position.

158. Press the CL Key.

159. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

160. Set the T12 COUNTER STOP switch to the OFF position.

161. Press the PROCEED button.

162. Verify the following events:

a. DSKY Register 1 displays 3-5 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

163. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

164. Verify that DSKY Register 2 displays 05000 with 00000 in DSKY Register 3. Stamp data sheet.

165. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 5000 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST14 - PROGRAM ANALYSIS

TTEST14 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 1. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-1 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 1 Counter and enters a CCS loop through the TIME 1 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 1 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

166. Set the T12 COUNTER STOP switch to the ON position.

167. Transfer Control to Bank 3, location 1474 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

168. Press the MONITOR indicator switch to the on (illuminated) position.

169. Press the CL Key.

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170. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

171. Set the T12 COUNTER STOP switch to the OFF position.

172. Press the PROCEED button.

173. Verify the following events:

a. DSKY Register 1 displays 4-1 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

174. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

175. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

176. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST15 - PROGRAM ANALYSIS

TTEST15 measures the time elapse (phase) between the incrementing of TIME 4 and TIME 2. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 4-2 in DSKY Register 1, positions 2 through 4.

b. Deposits a Positive Full Scale number into the TIME 4 Counter and enters a CCS loop through the TIME 4 location sampling for a zero condition.

c. After TIME 4 increments to zero, the program starts the external counter (FREQUENCY COUNTER).

d. Deposits a Positive Full Scale number into the TIME 2 Counter and enters a CCS loop through the TIME 2 location sampling for a zero condition.

e. Stops the external counter immediately after TIME 2 switches to zero and displays the number 02500 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

177. Set the T12 COUNTER STOP switch to the ON position.

178. Transfer Control to Bank 3, location 1515 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

179. Press the MONITOR indicator switch to the on (illuminated) position.

180. Press the CL Key.

181. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

182. Set the T12 COUNTER STOP switch to the OFF position.

183. Press the PROCEED button.

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184. Verify the following events:

a. DSKY Register 1 display 4-2 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

185. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

186. Verify that DSKY Register 2 displays 02500 with 00000 in DSKY Register 3. Stamp data sheet.

187. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 2500 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

TTEST16 - PROGRAM ANALYSIS

TTEST16 measures the time elapse (phase) between the incrementing of TIME 3 and TIME 6. The programmed functions of the test routine are executed in the order described below.

a. Clears the DSKY display and displays 3-6 in DSKY Register 1, positions 2 through 4.

b. Deposits a Negative Full Scale number into the TIME 6 Counter and enables the T6 Rupt (Bit 16 of Channel 13).

c. Deposits a Positive Full Scale number into the TIME 3 Counter and enters a CCS loop through the TIME 3 location sampling for a zero condition.

d. After TIME 3 changes to zero, the program starts the external counter (FREQUENCY COUNTER) and inserts a 1 into the TIME 6 Counter.

e. Samples the TIME 6 Counter for a negative zero condition, and after detecting this condition, stops the external counter.

f. Displays the number 03125 in DSKY Register 2 and 00000 in DSKY Register 3. This number is compared (by the operator) with the time measurement on the FREQUENCY COUNTER for agreement within ±2 counts in the least significant counter position.

188. Set the T12 COUNTER STOP switch to the ON position.

189. Transfer Control to Bank 3, location 1537 using the procedure of JDC 05412 (Transfer Control Operating Procedure).

190. Press the MONITOR indicator switch to the on (illuminated) position.

191. Press the CL Key.

192. Press the RESET button on the FREQUENCY COUNTER and verify that the display is zeroed.

193. Set the T12 COUNTER STOP switch to the OFF position.

194. Press the PROCEED button.

195. Verify the following events:

a. DSKY Register 1 displays 3-6 in positions 2 through 4.

b. The FREQUENCY COUNTER is counting.

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c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

196. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

197. Verify that DSKY Register 2 displays 03125 with 00000 in DSKY Register 3. Stamp data sheet.

198. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 312.5 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

WARNING TEST (WTEST) - PROGRAM ANALYSIS

The purpose of this test is to check the Warning Alarm. Upon entering the test, the state of the Warning Alarm is examined. If the Warning Alarm has been set the program will energize the Computer Activity (COMP ACTY) indicator on the DSKY. A Warning Alarm condition will also illuminate the AGC ALARMS indicator 9 on the LOGIC DRAWER NO. 1 panel of the CTS. The program then provides a 15 second delay during which, the Warning Light should be extinguished (if illuminated). If the Warning Light is still on at the end of this period, the program will enter the STOP Fail routine and the test will be terminated. If the preliminary check was successful, eight additional checks will be performed. Failure of anyone of these checks is indicated in the form of a (15 second) display in DSKY Register 1 without terminating the test. A failure indication is characterized by a 9-displayed in positions 2 and 3 followed by the check number in position 4. (For example if Check #1 fails, Register 1 will display 9-1.) After the failure indication has been displayed for 15 seconds the program will continue on to the next check. The eight checks employ the same philosophy. Each is concerned with pulsing the test alarm bit every "Y" seconds over a period of "Z" seconds. The state of the warning bit is examined at the end of the "Z" seconds and, if it is not what is expected, there is a 15 second fail display.

Each time the Test Alarm bit is pulsed (i.e., every "Y" seconds during a check), the state of the warning bit is checked. The COMP ACTY indicator on the DSKY is then used to indicate the condition of the warning bit. If the warning bit is on the COMP ACTY indicator will be turned on. If the warning bit is off the COMP ACTY indicator will be extinguished.

During the performance of a particular check, the DSKY will display the following:

R1 = 8- "test #(1-8)"

R2 = "Y" - how often the test alarm bit is being pulsed (shown in seconds and hundredths of seconds)

R3 = "Z" - length of time over which the alarm bit is pulsed (in seconds).

At the end of the check, R2 and R3 are blanked and, if success, 8-"test #" remains in R1. Otherwise R1 becomes 9- "test #".

The specifications for each check are shown in table 1.

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Table 1. Alarm Test Specifications

Check No.	R1 Display	R2 (Y)*	R3 (Z)	Initial Warning State	End Expected Warning State
1	8-1	3.00	60	OFF	OFF
2	8-2	2.00	60	OFF	OFF or ON accepted
3	8-3	1.00	12	OFF	ON
4	8-4	0.16	1	OFF	ON
5	8-5	0.50	60	ON	ON
6	8-6	1.00	60	ON	ON
7	8-7	2.00	60	ON	OFF or ON accepted
8	8-8	3.00	60	ON	OFF

*(1 pulse every Y.YY secs. for ZZ seconds)

199. Set the T12 COUNTER STOP switch to the ON position.

200. Transfer Control to Bank 4, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

201. Press the MONITOR indicator switch to the on (illuminated) position.

202. Press the CL Key.

203. Set the T12 COUNTER STOP switch to the OFF position.

204. Press the PROCEED button.

205. Verify that the DSKY COMP ACTY indicator is illuminated and DSKY Register 1 displays 8-1.

206. Verify that the DSKY COMP ACTY indicator is extinguished and the DSKY Registers display the following:

Register	Display
1	8-1
2	00300
3	00060

207. Verify that DSKY Registers 2 and 3 are blanked and 8-1 remains in DSKY Register 1. Stamp data sheet.

NOTE: Several checks to follow have extremely short DSKY display times. It is suggested that verification of these checks be initially recorded by a check mark on the JDC sheet itself. The data sheet is then stamped immediately on the conclusion of the WARNING test.

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208. Verify that the DSKY Registers display the following:

Register	Display
1	8-2
2	00200
3	00060

209. Verify that the DSKY COMP ACTY indicator is illuminated but extinguishes in less than a minute.

210. Verify that DSKY Registers 2 and 3 are blanked with 8-2 still in DSKY Register 1. Stamp data sheet.

211. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-3
2	00100
3	00012

212. Verify that DSKY Registers 2 and 3 are blanked, the COMP ACTY indicator is extinguished, and DSKY Register 1 still displays 8-3. Stamp data sheet.

213. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-4
2	00016
3	00001

Stamp data sheet.

214. Verify that the DSKY Registers display the following:

Register	Display
1	8-5
2	00050
3	00060

215. Verify that the DSKY COMP ACTY indicator is illuminated.

216. Verify that the DSKY Registers 2 and 3 are blanked, the DSKY COMP ACTY indicator is still illuminated, and DSKY Register 1 still displays 8-5. Stamp data sheet.

217. Verify that the DSKY Register 1 is blanked and the COMP ACTY indicator is extinguished.

218. Verify that the DSKY Registers display the following:

Register	Display
1	8-6
2	00100
3	00060

219. Verify that the COMP ACTY indicator is illuminated.

220. Verify that DSKY Registers 2 and 3 are blanked with the COMP ACTY indicator still illuminated and 8-6 is still displayed in Register 1. Stamp data sheet.

221. Verify that the COMP ACTY indicator is extinguished and the DSKY Registers now display the following:

Register	Display
1	8-7
2	00200
3	00060

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222. Verify that the COMP ACTY indicator illuminates.

223. Verify that DSKY Registers 2 and 3 are blanked with the COMP ACTY indicator still illuminated and 8-7 is still displayed in Register 1. Stamp data sheet.

224. Verify that the COMP ACTY indicator extinguishes.

225. Verify that DSKY Register 1 flashes 8-7 once.

226. Verify that the DSKY Registers now display the following:

Register	Display
1	8-8
2	00300
3	00060

227. Verify that the DSKY Registers 2 and 3 are blanked with 8-8 still displayed in Register 1.

228. Verify that DSKY Registers now display the following success indication.

Register	Display
1	8-8
2	99999
3	99999

Stamp data sheet.

229. A failure indication of any one of the eight checks will be displayed in DSKY Register 1 at the end of that particular check. The failure display will be an 8-9 presented in positions 2 through 4 of Register 1. In the event a failure occurs rerun the test by performing steps 199 through 204 again. If the failure reoccurs discontinue further testing.

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c. DSKY Registers 2 and 3 are blank.

Stamp data sheet.

196. Verify that the FREQUENCY COUNTER has stopped counting and record the display number on the data sheet.

197. Verify that DSKY Register 2 displays 03125 with 00000 in DSKY Register 3. Stamp data sheet.

198. Verify that the time measurement displayed on the FREQUENCY COUNTER equals the DSKY count of 312.5 microseconds within ±2 counts in the least significant counter position. Stamp data sheet.

WARNING TEST (WTEST) - PROGRAM ANALYSIS

The purpose of this test is to check the Warning Alarm. Upon entering the test, the state of the Warning Alarm is examined. If the Warning Alarm has been set the program will energize the Computer Activity (COMP ACTY) indicator on the DSKY. A Warning Alarm condition will also illuminate the AGC ALARMS indicator 9 on the LOGIC DRAWER NO. 1 panel of the CTS. The program then provides a 15 second delay during which, the Warning Light should be extinguished (if illuminated). If the Warning Light is still on at the end of this period, the program will enter the STOP Fail routine and the test will be terminated. If the preliminary check was successful, eight additional checks will be performed. Failure of anyone of these checks is indicated in the form of a (15 second) display in DSKY Register 1 without terminating the test. A failure indication is characterized by a 9-displayed in positions 2 and 3 followed by the check number in position 4. (For example if Check #1 fails, Register 1 will display 9-1.)

After the failure indication has been displayed for 15 seconds the program will continue on to the next check. The eight checks employ the same philosophy. Each is concerned with pulsing the test alarm bit every "Y" seconds over a period of "Z" seconds. The state of the warning bit is examined at the end of the "Z" seconds and, if it is not what is expected, there is a 15 second fail display.

Each time the Test Alarm bit is pulsed (i.e., every "Y" seconds during a check), the state of the warning bit is checked. The COMP ACTY indicator on the DSKY is then used to indicate the condition of the warning bit. If the warning bit is on the COMP ACTY indicator will be turned on. If the warning bit is off the COMP ACTY indicator will be extinguished.

During the performance of a particular check, the DSKY will display the following:

R1 = 8- "test #(1-8)"

R2 = "Y" - how often the test alarm bit is being pulsed (shown in seconds and hundredths of seconds)

R3 = "Z" - length of time over which the alarm bit is pulsed (in seconds).

At the end of the check, R2 and R3 are blanked and, if success, 8-"test #" remains in R1. Otherwise R1 becomes 9- "test #".

The specifications for each check are shown in table 1.

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Table 1. Alarm Test Specifications

Check No.	R1 Display	R2 (Y)*	R3 (Z)	Initial Warning State	End Expected Warning State
1	8-1	3.00	60	OFF	OFF
2	8-2	2.00	60	OFF	OFF or ON accepted
3	8-3	1.00	12	OFF	ON
4	8-4	0.16	1	OFF	ON
5	8-5	0.50	60	ON	ON
6	8-6	1.00	60	ON	ON
7	8-7	2.00	60	ON	OFF or ON accepted
8	8-8	3.00	60	ON	OFF

*(1 pulse every Y.YY secs. for ZZ seconds)

199. Set the T12 COUNTER STOP switch to the ON position.

200. Transfer Control to Bank 4, location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

201. Press the MONITOR indicator switch to the on (illuminated) position.

202. Press the CL Key.

203. Set the T12 COUNTER STOP switch to the OFF position.

204. Press the PROCEED button.

205. Verify that the DSKY COMP ACTY indicator is illuminated and DSKY Register 1 displays 8-1.

206. Verify that the DSKY COMP ACTY indicator is extinguished and the DSKY Registers display the following:

Register	Display
1	8-1
2	00300
3	00060

207. Verify that DSKY Registers 2 and 3 are blanked and 8-1 remains in DSKY Register 1. Stamp data sheet.

NOTE: Several checks to follow have extremely short DSKY display times. It is suggested that verification of these checks be initially recorded by a check mark on the JDC sheet itself. The data sheet is then stamped immediately on the conclusion of the WARNING test.

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208. Verify that the DSKY Registers display the following:

Register	Display
1	8-2
2	00200
3	00060

209. Verify that the DSKY COMP ACTY indicator is illuminated but extinguishes in less than a minute.

210. Verify that DSKY Registers 2 and 3 are blanked with 8-2 still in DSKY Register 1. Stamp data sheet.

211. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-3
2	00100
3	00012

212. Verify that DSKY Registers 2 and 3 are blanked, the COMP ACTY indicator is extinguished, and DSKY Register 1 still displays 8-3. Stamp data sheet.

213. Verify that the DSKY COMP ACTY indicator is on and the DSKY Registers now display the following:

Register	Display
1	8-4
2	00016
3	00001

Stamp data sheet.

214. Verify that the DSKY Registers display the following:

Register	Display
1	8-5
2	00050
3	00060

215. Verify that the DSKY COMP ACTY indicator is illuminated.

216. Verify that the DSKY Registers 2 and 3 are blanked, the DSKY COMP ACTY indicator is still illuminated, and DSKY Register 1 still displays 8-5. Stamp data sheet.

217. Verify that the DSKY Register 1 is blanked and the COMP ACTY indicator is extinguished.

218. Verify that the DSKY Registers display the following:

Register	Display
1	8-6
2	00100
3	00060

219. Verify that the COMP ACTY indicator is illuminated.

220. Verify that DSKY Registers 2 and 3 are blanked with the COMP ACTY indicator still illuminated and 8-6 is still displayed in Register 1. Stamp data sheet.

221. Verify that the COMP ACTY indicator is extinguished and the DSKY Registers now display the following:

Register	Display
1	8-7
2	00200
3	00060

DATE ________

---

222. Verify that the COMP ACTY indicator illuminates.

223. Verify that DSKY Registers 2 and 3 are blanked with the COMP ACTY indicator still illuminated and 8-7 is still displayed in Register 1. Stamp data sheet.

224. Verify that the COMP ACTY indicator extinguishes.

225. Verify that DSKY Register 1 flashes 8-7 once.

226. Verify that the DSKY Registers now display the following:

Register	Display
1	8-8
2	00300
3	00060

227. Verify that the DSKY Registers 2 and 3 are blanked with 8-8 still displayed in Register 1.

228. Verify that DSKY Registers now display the following success indication.

Register	Display
1	8-8
2	99999
3	99999

Stamp data sheet.

229. A failure indication of any one of the eight checks will be displayed in DSKY Register 1 at the end of that particular check. The failure display will be an 8-9 presented in positions 2 through 4 of Register 1. In the event a failure occurs rerun the test by performing steps 199 through 204 again. If the failure reoccurs discontinue further testing.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 8

JDC
NO. 05773
REV. —
INITIAL TDRR 32801

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION
APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
18.	TTEST4 - Ready for Standby	FREQUENCY COUNTER is counting. DSKY Register 1 is 24-4. DSKY Register 2 and 3 are blank.	
21.	TTEST4 - Amount of time spent in Standby	Computer operated in the Standby mode for a period of	
22.	TTEST4 - Out of Standby	DSKY STBY indicator extinguishes	
28.	TTEST4 - Measurement	FREQUENCY COUNTER totals	
29.	TTEST4 - DSKY Display - Calculations	Registers 2 and 3 displays DSKY NUM/32	
31.	TTEST4 - Evaluation	The data recorded in step 28 agrees with the results of the Calculation of step 29 within ± 0.2 milliseconds.	
39.	TTEST1 - Start Check	DSKY Register 1 is 24-1, FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 8

JDC
NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
40.	TTEST1 - Measurement	FREQUENCY COUNTER totals	
41.	TTEST1 - DSKY Displays	5120	
42.	TTEST1 - Evaluation	Results in steps 40 and 41 are within ±2 counts in the least significant counter position.	
50.	TTEST2 - Start Check	DSKY Register 1 is 24-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
51.	TTEST2 - Measurement	FREQUENCY COUNTER totals	
52.	TTEST2 - DSKY Displays	00010	
53.	TTEST2 - Evaluation	Results in steps 51 and 52 are within ±2 counts in the least significant counter position.	
61.	TTEST3 - Start Check	DSKY Register 1 is 24-3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
62.	TTEST3 - Measurement	FREQUENCY COUNTER totals	
63.	TTEST3 - DSKY Displays	5120	
64.	TTEST3 - Evaluation	Results in steps 62 and 63 are within ±2 counts in the least significant counter position.	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 8

JDC
NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
72.	TTEST5 - Start Check	DSKY Register 1 is 1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
73.	TTEST5 - Measurement	FREQUENCY COUNTER totals	
74.	TTEST5 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
75.	TTEST5 - Evaluation	Results in steps 73 and 74 are within ±2 counts in the least significant counter position.	
83.	TTEST6 - Start Check	DSKY Register 1 is 2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
84.	TTEST6 - Measurement	FREQUENCY COUNTER totals	
85.	TTEST6 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
86.	TTEST6 - Evaluation	Results in steps 84 and 85 are within ± 2 counts in the least significant counter position.	
94.	TTEST7 - Start Check	DSKY Register 1 is 3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
95.	TTEST7 - Measurement	FREQUENCY COUNTER totals	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 8

JDC
NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
96.	TTEST7 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
97.	TTEST7 - Evaluation	Results in steps 95 and 96 are within ±2 counts in the least significant counter position.	
105.	TTEST8 - Start Check	DSKY Register 1 is 4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
106.	TTEST8 - Measurement	FREQUENCY COUNTER totals	
107.	TTEST8 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
108.	TTEST8 - Evaluation	Results in steps 106 and 107 are within ±2 counts in the least significant counter position.	
116.	TTEST9 - Start Check	DSKY Register 1 is 5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
117.	TTEST9 - Measurement	FREQUENCY COUNTER totals	
118.	TTEST9 - DSKY Displays	Reg. 2 = 16383, Reg. 3 - 00000	
119.	TTEST9 - Evaluation	Results in steps 117 and 118 are within ±2 counts in the least significant counter position.	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 8

JDC
NO. 05773
REV. —
INITIAL TDRR 32801

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
18.	TTEST4 - Ready for Standby	FREQUENCY COUNTER is counting. DSKY Register 1 is 24-4. DSKY Register 2 and 3 are blank.	
21.	TTEST4 - Amount of time spent in Standby	Computer operated in the Standby mode for a period of	
22.	TTEST4 - Out of Standby	DSKY STBY indicator extinguishes	
28.	TTEST4 - Measurement	FREQUENCY COUNTER totals	
29.	TTEST4 - DSKY Display - Calculations	Registers 2 and 3 displays DSKY NUM/32	
31.	TTEST4 - Evaluation	The data recorded in step 28 agrees with the results of the Calculation of step 29 within ± 0.2 milliseconds.	
39.	TTEST1 - Start Check	DSKY Register 1 is 24-1, FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 8

JDC
NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
40.	TTEST1 - Measurement	FREQUENCY COUNTER totals	
41.	TTEST1 - DSKY Displays	5120	
42.	TTEST1 - Evaluation	Results in steps 40 and 41 are within ±2 counts in the least significant counter position.	
50.	TTEST2 - Start Check	DSKY Register 1 is 24-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
51.	TTEST2 - Measurement	FREQUENCY COUNTER totals	
52.	TTEST2 - DSKY Displays	00010	
53.	TTEST2 - Evaluation	Results in steps 51 and 52 are within ±2 counts in the least significant counter position.	
61.	TTEST3 - Start Check	DSKY Register 1 is 24-3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
62.	TTEST3 - Measurement	FREQUENCY COUNTER totals	
63.	TTEST3 - DSKY Displays	5120	
64.	TTEST3 - Evaluation	Results in steps 62 and 63 are within ±2 counts in the least significant counter position.	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 8

JDC
NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
72.	TTEST5 - Start Check	DSKY Register 1 is 1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
73.	TTEST5 - Measurement	FREQUENCY COUNTER totals	
74.	TTEST5 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
75.	TTEST5 - Evaluation	Results in steps 73 and 74 are within ±2 counts in the least significant counter position.	
83.	TTEST6 - Start Check	DSKY Register 1 is 2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
84.	TTEST6 - Measurement	FREQUENCY COUNTER totals	
85.	TTEST6 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
86.	TTEST6 - Evaluation	Results in steps 84 and 85 are within ± 2 counts in the least significant counter position.	
94.	TTEST7 - Start Check	DSKY Register 1 is 3. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
95.	TTEST7 - Measurement	FREQUENCY COUNTER totals	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 8

JDC
NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
96.	TTEST7 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
97.	TTEST7 - Evaluation	Results in steps 95 and 96 are within ±2 counts in the least significant counter position.	
105.	TTEST8 - Start Check	DSKY Register 1 is 4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
106.	TTEST8 - Measurement	FREQUENCY COUNTER totals	
107.	TTEST8 - DSKY Displays	Reg. 2 = 16383, Reg. 3 = 00000	
108.	TTEST8 - Evaluation	Results in steps 106 and 107 are within ±2 counts in the least significant counter position.	
116.	TTEST9 - Start Check	DSKY Register 1 is 5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
117.	TTEST9 - Measurement	FREQUENCY COUNTER totals	
118.	TTEST9 - DSKY Displays	Reg. 2 = 16383, Reg. 3 - 00000	
119.	TTEST9 - Evaluation	Results in steps 117 and 118 are within ±2 counts in the least significant counter position.	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 8

JDC
NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
128.	TTEST10 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
129.	TTEST10 - Measurement	FREQUENCY COUNTER totals	
130.	TTEST10 - DSKY Displays	Reg. 2 = 10239, Reg. 3 - 06000	
131.	TTEST10 - Evaluation	Results in steps 129 and 130 are within ±2 counts in the least significant counter position.	
139.	TTEST11 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
140.	TTEST11 - Measurement	FREQUENCY COUNTER totals	
141.	TTEST11 - DSKY Displays	Reg. 2 = 10239, Reg. 3 = 06000	
142.	TTEST11 - Evaluation	Results in steps 140 and 141 are within ±2 counts in the least significant counter position.	
151.	TTEST12 - Start Check	DSKY Register 1 is 3-4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
152.	TTEST12 - Measurement	FREQUENCY COUNTER totals	

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 8

JDC
NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
153.	TTEST12 - DSKY Displays	Reg. 2 = 07500, Reg. 3 = 00000	
154.	TTEST12 - Evaluation	Results in steps 152 and 153 are within ±2 counts in the least significant counter position.	
162.	TTEST13 - Start Check	DSKY Register 1 is 3-5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
163.	TTEST13 - Measurement	FREQUENCY COUNTER totals	
164.	TTEST13 - DSKY Displays	Reg. 2 = 05000, Reg. 3 = 00000	
165.	TTEST13 - Evaluation	Results in steps 163 and 164 are within ±2 counts in the least significant counter position.	
173.	TTEST14 - Start Check	DSKY Register 1 is 4-1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
174.	TTEST14 - Measurement	FREQUENCY COUNTER totals	
175.	TTEST14 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
176.	TTEST14 - Evaluation	Results in steps 174 and 175 are within ±2 counts in the least significant counter position.	

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 8

JDC
NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
184.	TTEST15 - Start Check	DSKY Register 1 is 4-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
185.	TTEST15 - Measurement	FREQUENCY COUNTER totals	
186.	TTEST15 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
187.	TTEST15 - Evaluation	Results in steps 185 and 186 are within ±2 counts in the least significant counter position.	
195.	TTEST16 - Start Check	DSKY Register 1 is 3-6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
196.	TTEST16 - Measurement	FREQUENCY COUNTER totals	
197.	TTEST16 - DSKY Displays	Reg. 2 = 03125, Reg. 3 = 00000	
198.	TTEST16 - Evaluation	Results in steps 196 and 197 are within ±2 counts in the least significant counter position.	
207.	WTEST Check No. 1	DSKY Register 1 is 8-1. DSKY Registers 2 and 3 are blank.	
210.	WTEST Check No. 2	DSKY Register 1 is 8-2 and Flashes twice. DSKY Registers 2 and 3 are blank.	

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 8

JDC
NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
212.	WTEST Check No. 3	DSKY Register 1 is 8-3. DSKY Registers 2 and 3 are blank.	
213.	WTEST Check No. 4	DSKY Register 1 is 8-4. DSKY Registers 2 and 3 are 00016 and 00001 respectively.	
216.	WTEST Check No. 5	DSKY Register 1 is 8-5. DSKY Registers 2 and 3 are blank.	
220.	WTEST Check No. 6	DSKY Register 1 is 8-6. DSKY Registers 2 and 3 are blank. DSKY COMP ACTY is on.	
223.	WTEST Check No. 7	DSKY Register 1 is 8-7. DSKY Registers 2 and 3 are blank. DSKY COMP ACTY is on.	
228.	WTEST8 and Success Display	DSKY Register 1 is 8-8. DSKY Register 2 is 99999. DSKY Register 3 is 99999.	

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 8

JDC NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
128.	TTEST10 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
129.	TTEST10 - Measurement	FREQUENCY COUNTER totals	
130.	TTEST10 - DSKY Displays	Reg. 2 = 10239, Reg. 3 - 06000	
131.	TTEST10 - Evaluation	Results in steps 129 and 130 are within ±2 counts in the least significant counter position.	
139.	TTEST11 - Start Check	DSKY Register 1 is 6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
140.	TTEST11 - Measurement	FREQUENCY COUNTER totals	
141.	TTEST11 - DSKY Displays	Reg. 2 = 10239, Reg. 3 = 06000	
142.	TTEST11 - Evaluation	Results in steps 140 and 141 are within ±2 counts in the least significant counter position.	
151.	TTEST12 - Start Check	DSKY Register 1 is 3-4. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
152.	TTEST12 - Measurement	FREQUENCY COUNTER totals	

DATE ____________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 8

JDC NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
153.	TTEST12 - DSKY Displays	Reg. 2 = 07500, Reg. 3 = 00000	
154.	TTEST12 - Evaluation	Results in steps 152 and 153 are within ±2 counts in the least significant counter position.	
162.	TTEST13 - Start Check	DSKY Register 1 is 3-5. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
163.	TTEST13 - Measurement	FREQUENCY COUNTER totals	
164.	TTEST13 - DSKY Displays	Reg. 2 = 05000, Reg. 3 = 00000	
165.	TTEST13 - Evaluation	Results in steps 163 and 164 are within ±2 counts in the least significant counter position.	
173.	TTEST14 - Start Check	DSKY Register 1 is 4-1. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
174.	TTEST14 - Measurement	FREQUENCY COUNTER totals	
175.	TTEST14 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
176.	TTEST14 - Evaluation	Results in steps 174 and 175 are within ±2 counts in the least significant counter position.	

DATE ____________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 8

JDC NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
184.	TTEST15 - Start Check	DSKY Register 1 is 4-2. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
185.	TTEST15 - Measurement	FREQUENCY COUNTER totals	
186.	TTEST15 - DSKY Displays	Reg. 2 = 02500, Reg. 3 = 00000	
187.	TTEST15 - Evaluation	Results in steps 185 and 186 are within ±2 counts in the least significant counter position.	
195.	TTEST16 - Start Check	DSKY Register 1 is 3-6. FREQUENCY COUNTER is counting. DSKY Registers 2 and 3 are blank.	
196.	TTEST16 - Measurement	FREQUENCY COUNTER totals	
197.	TTEST16 - DSKY Displays	Reg. 2 = 03125, Reg. 3 = 00000	
198.	TTEST16 - Evaluation	Results in steps 196 and 197 are within ±2 counts in the least significant counter position.	
207.	WTEST Check No. 1	DSKY Register 1 is 8-1. DSKY Registers 2 and 3 are blank.	
210.	WTEST Check No. 2	DSKY Register 1 is 8-2 and Flashes twice. DSKY Registers 2 and 3 are blank.	

DATE ____________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 8

JDC NO. 05773
REV. —

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-TIME AND WARNING CHECKS

Step	Parameter	Specification	Results
212.	WTEST Check No. 3	DSKY Register 1 is 8-3. DSKY Registers 2 and 3 are blank.	
213.	WTEST Check No. 4	DSKY Register 1 is 8-4. DSKY Registers 2 and 3 are 00016 and 00001 respectively.	
216.	WTEST Check No. 5	DSKY Register 1 is 8-5. DSKY Registers 2 and 3 are blank.	
220.	WTEST Check No. 6	DSKY Register 1 is 8-6. DSKY Registers 2 and 3 are blank. DSKY COMP ACTY is on.	
223.	WTEST Check No. 7	DSKY Register 1 is 8-7. DSKY Registers 2 and 3 are blank. DSKY COMP ACTY is on.	
228.	WTEST8 and Success Display	DSKY Register 1 is 8-8. DSKY Register 2 is 99999. DSKY Register 3 is 99999.	

DATE ____________

JOB TIME & WARNING CHECKS MYLAR TAPE

JDC 05774 REV. — PAGE 1 OF 1
INITIAL TDRR 32809 D.S. PGS 0

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the TIME & WARNING CHECKS Program, JDC 05772.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

JDC 05773
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB TIME & WARNING CHECKS MYLAR TAPE

JDC 05774 REV. — PAGE 1 OF 1

INITIAL TDRR 32809 D.S. PGS 0

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the TIME & WARNING CHECKS Program, JDC 05772.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

JDC 05773

ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-MEMCHECKS BANKS 0 AND 1

JDC 05775 **REV.** – **PAGE** 1 **OF** 5
INITIAL TDRR 32809 **D.S. PGS** 1

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

Tests all locations in Erasable Memory Banks 0 and 1, including Registers A, L, Q, Z, CYR, SR, CYL, and EDOP. Banks 0 and 1 are tested with checkerboard patterns, moving ones and zeroes, and by loading each location with its own Bank number and address. The final test of this program utilizes a sequence of Machine Instructions to manipulate the Editing Registers to provide a unique test exercise.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES JDC's 05406, 05407, 05412, 05413, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL
Program MEMCHECKS BANKS 0 AND 1 Mylar Tape, JDC 05776

PREPARATION

1. Perform the programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel.

3. Load Program MEMCHECKS BANKS 0 AND 1 (JDC 05776) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407, Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

7. Transfer Control Location 1174 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

8. Set the register select switch to the L position.

9. Press the Monitor indicator switch to the on (illuminated) position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-MEMCHECKS BANKS 0 AND 1

JDC 05775 **REV** – **PAGE** 2 **OF** 5

SUBSYSTEM Computer

ASSY

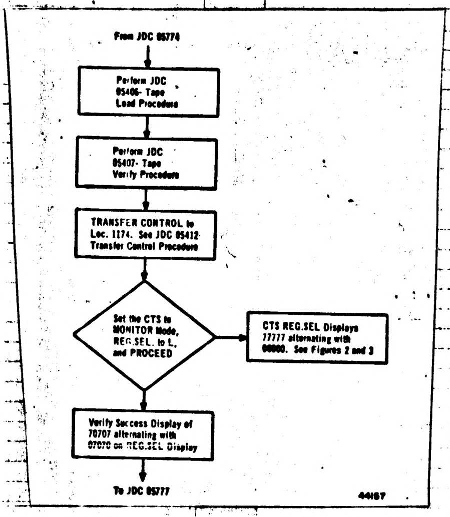
From JDC 05774
Perform JDC 05406- Tape Load Procedure
Perform JDC 05407- Tape Verify Procedure
TRANSFER CONTROL to Loc. 1174. See JDC 05412- Transfer Control Procedure
Set the CTS to MONITOR Mode, REG.SEL. to L, and PROCEED
CTS REG.SEL Displays 77777 alternating with 00000. See Figures 2 and 3
Verify Success Display of 70707 alternating with 07070 on REG.SEL Display
To JDC 05777
44167

Figure 1. Flowchart for Performing Program MEMCHECKS BANKS 0 AND 1

DATE ______

RAYTHEON COMPANY

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM - MEMCHECKS BANK 0 AND 1

JDC 05775 **REV** – **PAGE** 3 **OF** 5

SUBSYSTEM Computer

ASSY

10. Press the CL Key.

11. Set the T12 COUNTER STOP to the off position.

12. Press the PROCEED button.

13. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this test has been successfully completed. Stamp data sheet and proceed to JDC 05777. If the REG SEL display is 77777 alternating with 00000 complete the remaining steps of this JDC.

14. Set the T12 COUNTER STOP to the on position.

15. Set the register select switch to the A position.

16. Read the contents of location 0061 using the procedures of JDC 05409, Read AGC Operating Procedure.

17. Compare the address read out with those specified on Figure 2 and 3. The address will be numerically within a specific group on a particular flowgram. (For example, an address read out of 1265 would pertain to the first flowgram of Figure 2, Test A, L, Q, and Z Registers.) Follow the instructions shown in the selected flowgram, and if the program fails to reach a successful conclusion discontinue further testing.

DATE ______

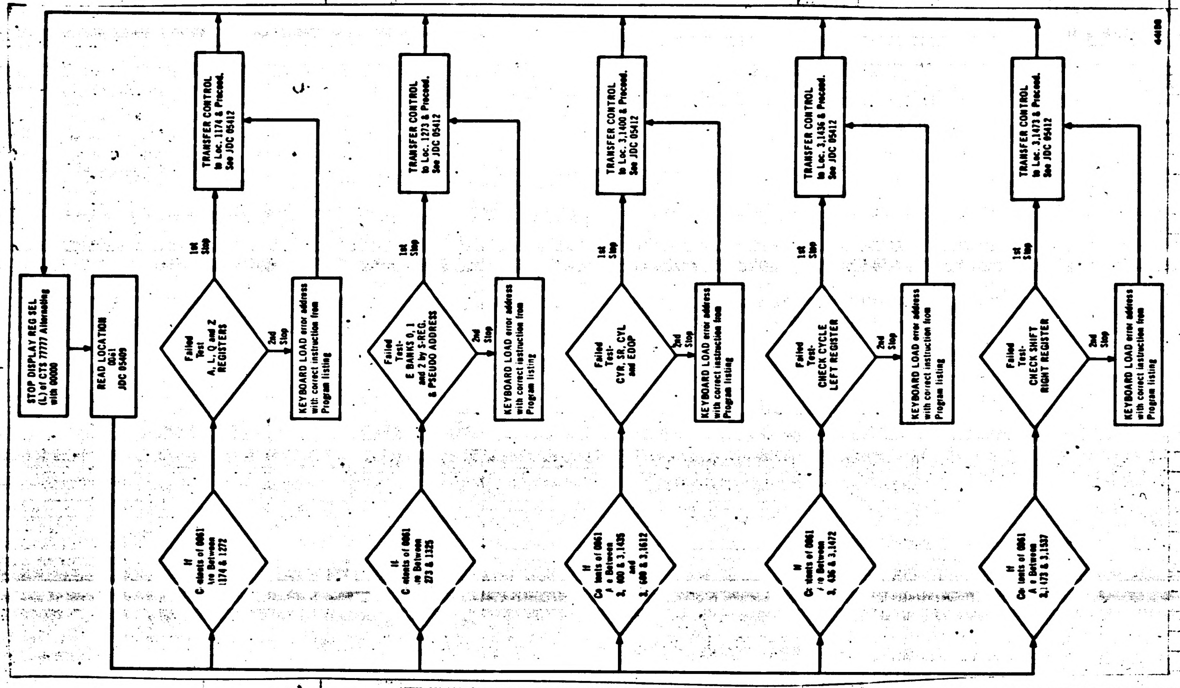
STOP DISPLAY REG SEL (L) of CTS 77777 Alternating with 00000
READ LOCATION 0061 JDC 05409
If Contents of 0061 Are Between 1174 & 1272
Failed Test A, L, Q and Z REGISTERS
1st Stop
2nd Stop
TRANSFER CONTROL to Loc. 1174 & Proceed. See JDC 05412
KEYBOARD LOAD error address with correct instruction from Program listing
If Contents of 0061 Are Between 273 & 1325
Failed Test- E BANKS 0, 1 and 2 by S-REG. & PSEUDO ADDRESS
TRANSFER CONTROL to Loc. 1273 & Proceed. See JDC 05412
If Contents of 0061 Are Between 3, 000 & 3,1435 and 3, 600 & 3,1612
Failed Test- CYR, SR, CYL and EDOP
TRANSFER CONTROL to Loc. 3,1400 & Proceed. See JDC 05412
If Contents of 0061 Are Between 3, 436 & 3,1472
Failed Test- CHECK CYCLE LEFT REGISTER
TRANSFER CONTROL to Loc. 3,1436 & Proceed. See JDC 05412
If Contents of 0061 Are Between 3,1473 & 3,1537
Failed Test- CHECK SHIFT RIGHT REGISTER
TRANSFER CONTROL to Loc. 3,1473 & Proceed. See JDC 05412
44486

Figure 2. Stop Flowchart for Locations 1174-3, 1637

DATE ________

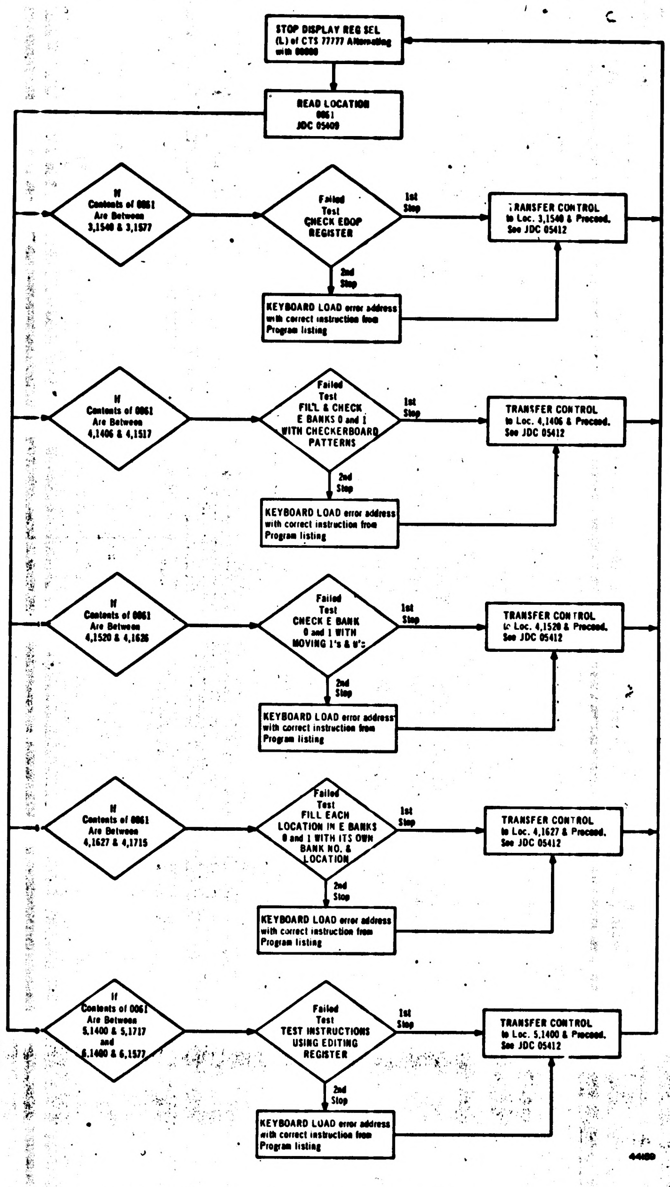
STOP DISPLAY REG SEL (L) of CTS 77777 Alternating with 00000
READ LOCATION 0061 JDC 05409
If Contents of 0061 Are Between 3,1540 & 3,1577
Failed Test CHECK EDOP REGISTER
1st Stop
TRANSFER CONTROL to Loc. 3,1540 & Proceed. See JDC 05412
2nd Stop
KEYBOARD LOAD error address with correct instruction from Program listing
If Contents of 0061 Are Between 4,1406 & 4,1517
Failed Test FILL & CHECK E BANKS 0 and 1 WITH CHECKERBOARD PATTERNS
1st Stop
TRANSFER CONTROL to Loc. 4,1406 & Proceed. See JDC 05412
2nd Stop
KEYBOARD LOAD error address with correct instruction from Program listing
If Contents of 0061 Are Between 4,1520 & 4,1626
Failed Test CHECK E BANK 0 and 1 WITH MOVING 1's & 0's
1st Stop
TRANSFER CONTROL to Loc. 4,1520 & Proceed. See JDC 05412
2nd Stop
KEYBOARD LOAD error address with correct instruction from Program listing
If Contents of 0061 Are Between 4,1627 & 4,1715
Failed Test FILL EACH LOCATION IN E BANKS 0 and 1 WITH ITS OWN BANK NO. & LOCATION
1st Stop
TRANSFER CONTROL to Loc. 4,1627 & Proceed. See JDC 05412
2nd Stop
KEYBOARD LOAD error address with correct instruction from Program listing
If Contents of 0061 Are Between 5,1400 & 5,1717 and 6,1400 & 6,1577
Failed Test TEST INSTRUCTIONS USING EDITING REGISTER
1st Stop
TRANSFER CONTROL to Loc. 5,1400 & Proceed. See JDC 05412
2nd Stop
KEYBOARD LOAD error address with correct instruction from Program listing
44180

Figure 3. Stop Flowchart for Location 3, 1540-6, 1577

DATE ____________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

NO. 05775 JDC
REV. —
INITIAL TDRR 32309

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-MEMCHECKS BANKS 0 AND 1

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE ______
NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION
APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
13	REG SEL displays success indication 70707 alternating with 07070	1111 000 111 000 111 alt. w/ 0000 111 000 111 000	

DATE ______

RAYTHEON

JOB MEMCHECK BANKS 0 & 1 TEST MYLAR TAPE

JDC 05776 **REV.** – **PAGE** 1 **OF** 1
INITIAL TDRR 32809 **D.S. PGS** 0

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the MEMCHECK BANKS 0 & 1 Program, JDC 05774

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC 05775
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JDC 05776 REV. — PAGE 1 OF 1
INITIAL TDRR 32809 D.S. PG'S 0

JOB MEMCHECK BANKS 0 & 1 TEST MYLAR TAPE

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the MEMCHECK BANKS 0 & 1 Program, JDC 05774

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC 05775
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

OPERATING PROCEDURE FOR (FVP) PROGRAM
JOB MEMCHECKS BANKS 2 THRU 7

JDC 05777 **REV.** — **PAGE** 1 **OF** 4
INITIAL TDRR 32809 **D.S. PGS** 1

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

Tests all locations in Erasable Memory Banks 2 Thru 7. Banks 2 through 7 are tested with checkerboard patterns, moving ones and zeros, and by loading each location with its own Bank number and address.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA

REFERENCES
JDC's 05406, 06507, 05412, 05413, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program MEMCHECKS 2 THRU 7 Mylar Tape, JDC 05778

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel.

3. Load Program MEMCHECKS BANKS 2 THRU 7 (JDC 05778) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407. Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

7. Transfer Control to Location 0152 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

8. Set the register select switch to the L position.

9. Press the MONITOR indicator switch to the on (illuminated) position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-MEMCHECKS BANKS 2 THRU 7

JDC 05777 **REV** — **PAGE** 2 **OF** 4

SUBSYSTEM Computer
ASSY

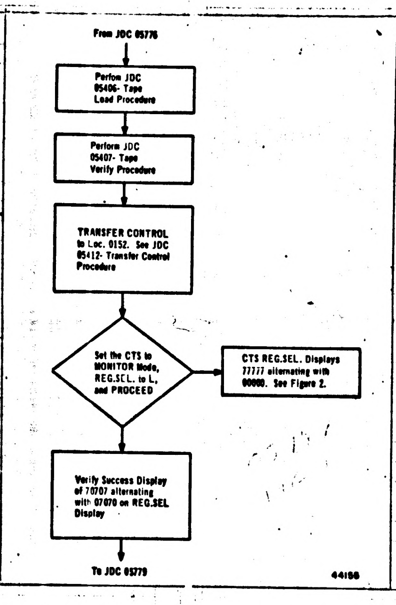
From JDC 05776
Perfom JDC 05406- Tape Load Procedure
Perform JDC 05407- Tape Verify Procedure
TRANSFER CONTROL to Loc. 0152. See JDC 05412- Transfer Control Procedure
Set the CTS to MONITOR Mode, REG.SEL. to L, and PROCEED
CTS REG.SEL. Displays 77777 alternating with 00000. See Figure 2.
Verify Success Display of 70707 alternating with 07070 on REG.SEL Display
To JDC 05779
44186

Figure 1. Flowchart for Performing Program MEMCHECKS BANKS 2 THRU 7

DATE ______

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM - MEMCHECKS BANKS 2 THRU 7

JDC 05777 **REV** — **PAGE** 3 **OF** 4

SUBSYSTEM Computer
ASSY

10. Press the CL Key.

11. Set the T12 COUNTER STOP to the off position.

12. Press the PROCEED button.

13. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this test has been successfully completed. Stamp data sheet and proceed to JDC 05779. If the REG SEL display is 77777 alternating with 00000 complete the remaining steps of this JDC.

14. Set the T12 COUNTER STOP to the on position.

15. Set the register select switch to the A position.

16. Read the contents of location 0061 using the procedures of JDC 05409. Read AGC Operating Procedure.

17. Compare the address read out with those specified on Figure 2. The address will be numerically within a specific group on a particular flowgram. (For example, an address read out of 202 would pertain to the first flowgram of Figure 2, TEST EBANKS 2 THRU 7 WITH CHECKERBOARD PATTERNS). Follow the instructions shown in the selected flowgram, and if the program fails to reach a successful conclusion discontinue further testing.

DATE ______

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-MEMCHECKS BANKS 2 THRU 7

JDC 05777 **REV** — **PAGE** 4 **OF** 4

SUBSYSTEM Computer
ASSY

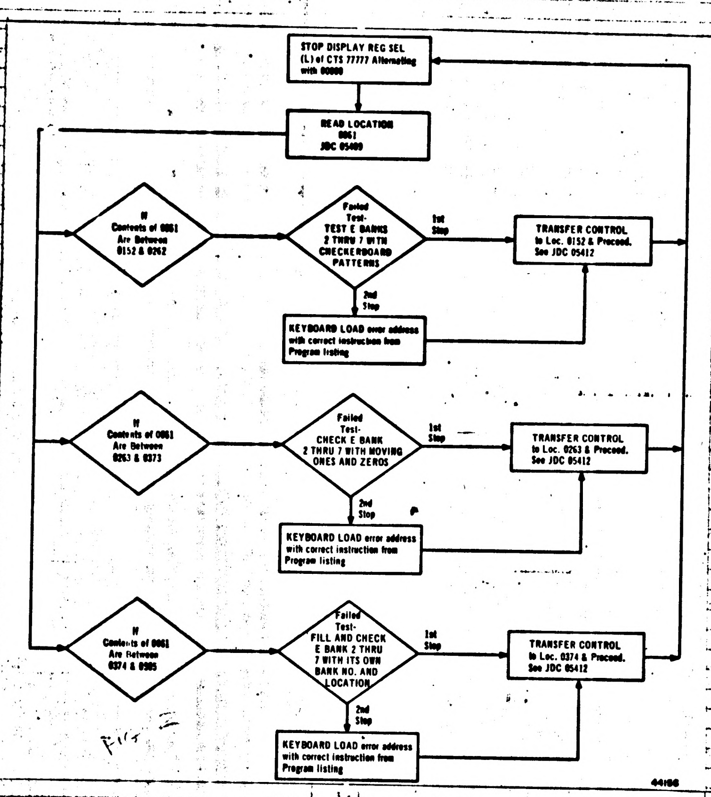
STOP DISPLAY REG SEL (L) of CTS 77777 Alternating with 00000
READ LOCATION 0061 JDC 05409
If Contents of 0061 Are Between 0152 & 0262
Failed Test- TEST E BANKS 2 THRU 7 WITH CHECKERBOARD PATTERNS
1st Stop
2nd Stop
TRANSFER CONTROL to Loc. 0152 & Proceed. See JDC 05412
KEYBOARD LOAD error address with correct instruction from Program listing
If Contents of 0061 Are Between 0263 & 0373
Failed Test- CHECK E BANK 2 THRU 7 WITH MOVING ONES AND ZEROS
1st Stop
2nd Stop
TRANSFER CONTROL to Loc. 0263 & Proceed. See JDC 05412
KEYBOARD LOAD error address with correct instruction from Program listing
If Contents of 0061 Are Between 0374 & 0505
Failed Test- FILL AND CHECK E BANK 2 THRU 7 WITH ITS OWN BANK NO. AND LOCATION
1st Stop
2nd Stop
TRANSFER CONTROL to Loc. 0374 & Proceed. See JDC 05412
KEYBOARD LOAD error address with correct instruction from Program listing
Fig 2
44186

Figure 2. STOP Flowchart

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05777 JDC
REV. –
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM - MEMCHECKS BANKS 2 THRU 7

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION   APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
13	REG SEL displays success indication 70707 alternating with 07070	1111 000 111 000 111 alt. w/ 0000 111 000 111 000	

DATE ____

RAYTHEON C

RAYTHEON

JOB MEMCHECK BANKS 2 THRU 7
TEST MYLAR TAPE

JDC 05778 REV. — PAGE 1 OF 1
INITIAL TDRR 32809 D.S. PGS 0

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the MEMCHECK BANKS 2 THRU 7 Program, JDC 05776.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC 05777
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE ______

JOB MEMCHECK BANKS 2 THRU 7
TEST MYLAR TAPE

JDC 05778 REV. — PAGE 1 OF 1
INITIAL TDRR 32809 D.S. PGS 0

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the MEMCHECK BANKS 2 THRU 7 Program, JDC 05776.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC 05777
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ____

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM - CHANNEL INST. CHECKS

JDC 05779 **REV.** — **PAGE** 1 **OF** 4
INITIAL TDRR 32809 **D.S. PGS** 1

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

Tests (Extracode) Channel Instructions READ, WRITE, RAND, ROR, RXOR, WAND, and WOR.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA

REFERENCES
JDC's 05406, 05413, 05412, 05407, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program CHANNEL INST. CHECKS Mylar Tape, JDC 05780

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel.

3. Load Program CHANNEL INST. CHECKS (JDC 05780) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407, Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

7. Transfer Control to Location 0132 using the procedures to JDC 05412 (Transfer Control Operating Procedure).

8. Set the register select switch to the L position.

9. Press the MONITOR indicator switch to the on (illuminated) position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-CHANNEL INST. CHECKS

JDC 05779 **REV** — **PAGE** 2 **OF** 4

SUBSYSTEM Computer
ASSY

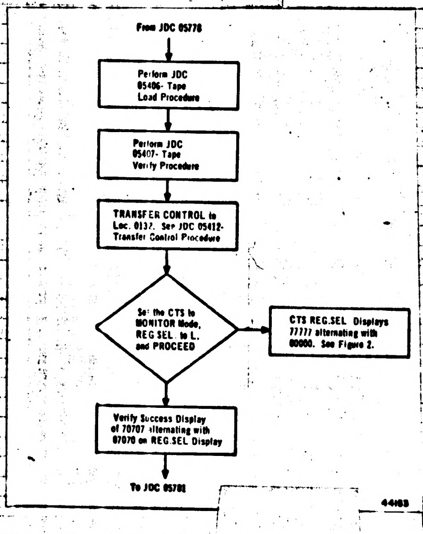
From JDC 05778
Perform JDC 05406- Tape Load Procedure
Perform JDC 05407- Tape Verify Procedure
TRANSFER CONTROL to Loc. 0132. See JDC 05412- Transfer Control Procedure
Set the CTS to MONITOR Mode, REG SEL to L, and PROCEED
CTS REG.SEL Displays 77777 alternating with 00000. See Figure 2.
Verify Success Display of 70707 alternating with 07070 on REG.SEL Display
To JDC 05781
44183

Figure 1. Flowchart for Performing Program CHANNEL INST. CHECKS

DATE ______

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM - CHANNEL INST. CHECKS

JDC 05779 **REV** — **PAGE** 3 **OF** 4

SUBSYSTEM Computer
ASSY

10. Press the CL Key.

11. Set the T12 COUNTER STOP to the off position.

12. Press the PROCEED button.

13. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this test has been successfully completed. Stamp data sheet and proceed to JDC 05781. If the REG SEL display is 77777 alternating with 00000 complete the remaining steps of this JDC.

14. Set the T12 COUNTER STOP to the on position.

15. Set the register select switch to the A position.

16. Read the contents of location 0061 using the procedures of JDC 05409. Read AGC Operating Procedure.

17. Compare the address read out with those specified on Figure 2. The address will be numerically within a specific group on a particular flowgram. For example, an address read out of 0207 would pertain to INSTRUCTION READ the first flowgram of Figure 2. Follow the instructions shown on the selected flowgram, and if the program fails to reach a successfuly conclusion discontinue further testing.

DATE ______

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-CHANNEL INST. CHECKS | **JDC** 05779 **REV** — **PAGE** 4 **OF** 4

SUBSYSTEM Computer | **ASSY**

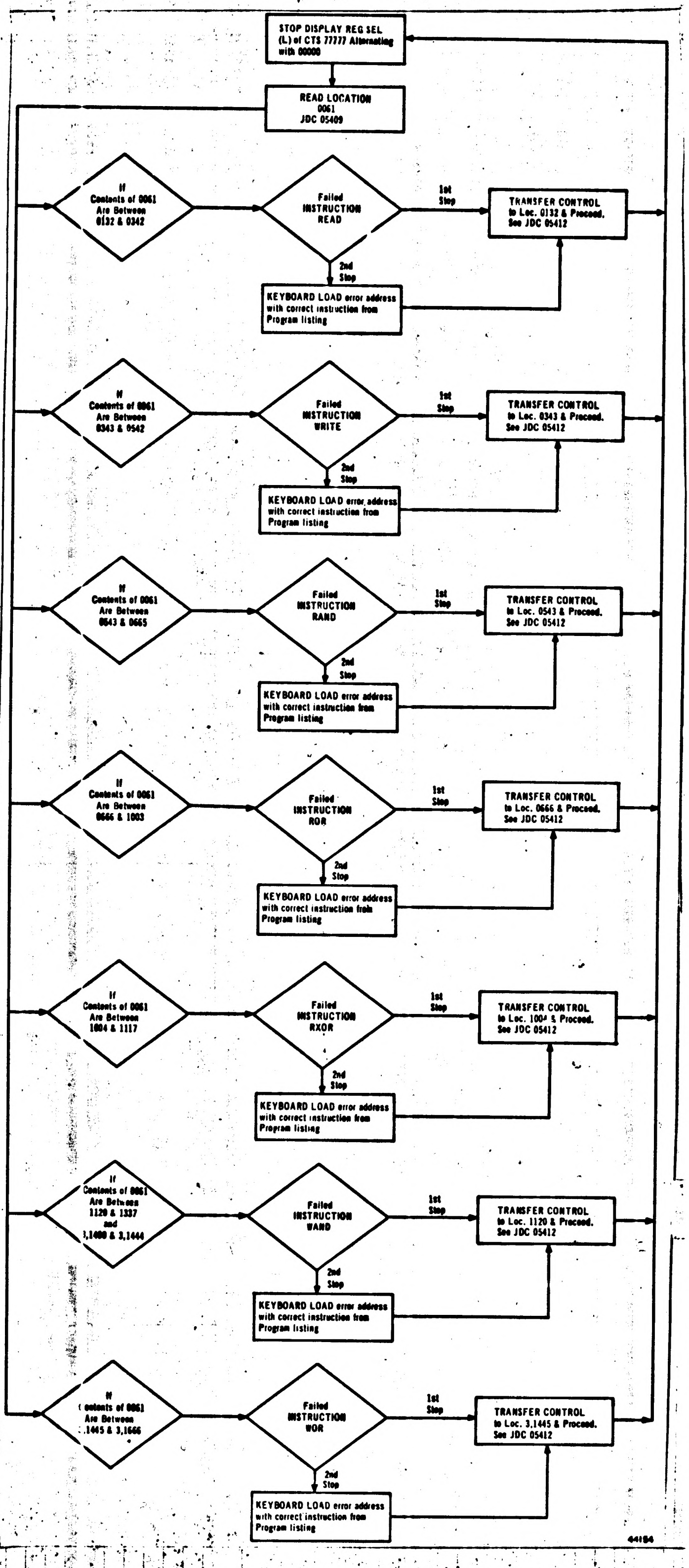
STOP DISPLAY REG SEL (L) of CTS 77777 Alternating with 00000
READ LOCATION 0061 JDC 05409
If Contents of 0061 Are Between 0132 & 0342
Failed INSTRUCTION READ
1st Stop
TRANSFER CONTROL to Loc. 0132 & Proceed. See JDC 05412
2nd Stop
KEYBOARD LOAD error address with correct instruction from Program listing
If Contents of 0061 Are Between 0343 & 0542
Failed INSTRUCTION WRITE
TRANSFER CONTROL to Loc. 0343 & Proceed. See JDC 05412
If Contents of 0061 Are Between 0543 & 0665
Failed INSTRUCTION RAND
TRANSFER CONTROL to Loc. 0543 & Proceed. See JDC 05412
If Contents of 0061 Are Between 0666 & 1003
Failed INSTRUCTION ROR
TRANSFER CONTROL to Loc. 0666 & Proceed. See JDC 05412
If Contents of 0061 Are Between 1004 & 1117
Failed INSTRUCTION RXOR
TRANSFER CONTROL to Loc. 1004 & Proceed. See JDC 05412
If Contents of 0061 Are Between 1120 & 1337 and 3,1400 & 3,1444
Failed INSTRUCTION WAND
TRANSFER CONTROL to Loc. 1120 & Proceed. See JDC 05412
If Contents of 0061 Are Between 3,1445 & 3,1666
Failed INSTRUCTION WOR
TRANSFER CONTROL to Loc. 3,1445 & Proceed. See JDC 05412
44184

Figure 2. Stop Flowchart

DATE ______

RAYTHEON COMPANY

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05779 IDC
REV. —
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-CHANNEL INST. CHECKS

ASSEMBLY UNDER TEST

TITLE ____________

SER. NO. ______ DWG ______ REV. ____

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________ SER. NO. ______ CAL DATE ______

NAME ____________ SER. NO. ______ CAL DATE ______

CONDUCTED BY ____________ NAME/AFFILIATION

APPROVED BY ____________ NAME/AFFILIATION

Step	Parameter	Specification	Results
13	REG SEL displays success indication 70707 alternating with 07070	1111 000 111 000 111 alt. w/ 0000 111 000 111 000	

DATE ______

RAYTHEON C

JDC 05780 REV. – PAGE 1 OF 1

JOB CHANNEL INST. CHECKS MYLAR TAPE

INITIAL TDRR 32809 D.S. PGS 0

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the CHANNEL INST. CHECKS Program, JDC 05778.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

JDC 05779

ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB CHANNEL INST. CHECKS MYLAR TAPE

JDC 05780 **REV.** – **PAGE** 1 **OF** 1

INITIAL TDRR 32809 **D.S. PGS** 1

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the CHANNEL INST. CHECKS Program, JDC 05778.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

JDC 05779

ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB OPERATING PROCEDURE FOR (FVP)
PROGRAM IN-OUT CHECKS

JDC 05781 **REV.** A **PAGE** 1 **OF** 10
INITIAL TDRR 32809 **D.S. PGS** 1

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

The IN-OUT Program contains eight individual test routines, identified as STARTP, STPIP, and TEST 1 through TEST 6. The tests are performed sequentially starting with TEST 6, followed by TEST 1 through 5. STARTP, STPIP. A description of each test is provided under the Program Analysis section included at the end of this JDC The sequence of testing is also shown in the Flowchart of Figure 1.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA
A	10-20-67	34890	1, 3	-	EA	-

REFERENCES JDC's 05406, 05407, 05412
05413, 05414
ND's 1021042, 1021043

IMPORTANT Do not attempt to perform this test until step 1 of this JDC has been verified

INTERVAL As required

TOOLS AND MATERIAL Program IN-OUT CHECKS Mylar Tape, JDC 05782

PREPARATION

1. Connect test cable W263 to connectors J4, J5, J7, and J8 of the AGC-OC. Cable W263 is supplied as part of the SUBSYSTEM TEST INTERCONNECTION SET under the Part Number 2016314-011.

2. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

3. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel.

4. Load Program IN-OUT CHECKS (JDC 05782) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

5. Rewind Tape.

6. Verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).

7. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

8. Press the CH33-10 indicator switch on the RDC INTERFACE Panel to the on (illuminated) position.

OPERATION

9. Transfer Control to E Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

VERIFICATION WITH SIDL REQUIRED BEFORE USE

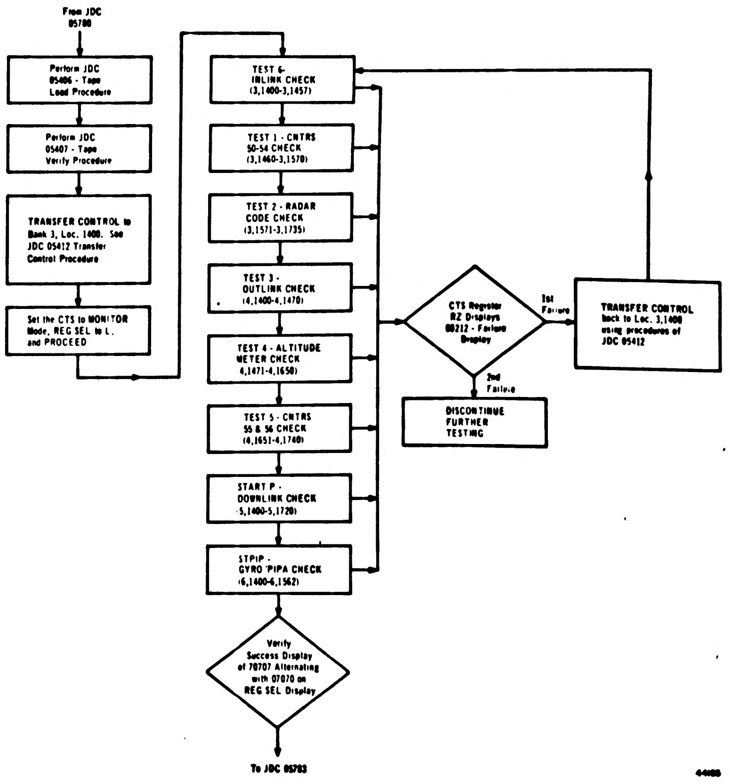
From JDC 05780
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 - Tape Verify Procedure
TRANSFER CONTROL to Bank 3, Loc. 1400. See JDC 05412 Transfer Control Procedure
Set the CTS to MONITOR Mode, REG SEL to L, and PROCEED
TEST 6 - INLINK CHECK (3,1400-3,1457)
TEST 1 - CNTRS 50-54 CHECK (3,1460-3,1570)
TEST 2 - RADAR CODE CHECK (3,1571-3,1735)
TEST 3 - OUTLINK CHECK (4,1400-4,1470)
TEST 4 - ALTITUDE METER CHECK (4,1471-4,1650)
TEST 5 - CNTRS 55 & 56 CHECK (4,1651-4,1740)
START P - DOWNLINK CHECK (5,1400-5,1720)
STPIP - GYRO PIPA CHECK (6,1400-6,1562)
Verify Success Display of 70707 Alternating with 07070 on REG SEL Display
To JDC 05783
CTS Register RZ Displays 00212 - Failure Display
1st Failure
2nd Failure
TRANSFER CONTROL back to Loc. 3,1400 using procedures of JDC 05412
DISCONTINUE FURTHER TESTING
44105

Figure 1. Flowchart for Performing Program IN-OUT CHECKS

---

10. Press the MONITOR indicator switch to the on (illuminated) position.

11. Press the CL Key.

12. Set the register select switch to position L.

13. Set the INHIBIT INCREMENTS switch to the OFF position.

14. Set the T12 COUNTER STOP switch to the OFF position.

15. Press the PROCEED button.

16. No further operator control is required to complete the eight checks. Checks are performed sequentially under program control. The program will be automatically terminated in either a success display or a stop display. If the test is successful Register L on the Programmer and Monitor Panel will display 70707 alternating with 07070. If the test fails to complete anyone of the eight Checks, Register Z will display the address 0212, and Register A will display the return address (to the main program).

If the test terminates in a failure, Transfer Control (using the procedures of JDC 05412) back to Location 3, 1400, and PROCEED. If the test fails again discontinue further testing, and note the contents of Register A (return address). Compare this address with the address groups of each of the eight test sequences. The "failed" address should fall within one of these groupings. The specific test functions unable to be performed are determined by referencing the Program Analysis section for a description of the "failed" test.

17. After completion of this JDC, remove test cable W263 (Part No. 2016314-011) installed in step 1 and reconnect the cables that were removed from J4, J5, J7, and J8.

PROGRAM ANALYSIS

TEST 6 (Locations 3, 1400-3, 1457)

This test checks the decoding circuitry controlled by bits 5 and 6 of channel 13. Bits 5 and 6 are decoded to control information gated into the UPLINK counter (by way of the counter priority cells) from either of two sources, interface signals UPLINK or CROSSLINK. It also checks that the circuit used for detecting excessive rates of information flow from these two sources is operative. Excessive data rate is indicated by the INLINK TOO FAST bit of channel 33 when an excessive rate is detected. The INLINK TOO FAST function is tested by using bit 6 of channel 14 to generate signal GYENAB and making the interface connection such that GYENAB causes XLINKO. The frequency of GYENAB is approximately 102 KC. The test bit configurations are listed as follows·

Set Ch. 13 Bits 6 5	Set Ch. 14 Bit 6	In Ch. 33 Bit 11
		Look for a
0 0	1	1
1 0	1	1
1 1	1	1
0 1	1	0

The bits of channel 33 are inverted. Therefore bit 11 will be a one until the INLINK TOO FAST signal is present. In checks one through three Bit 5 of Channel 13 and Bit 10 of Channel 33 inhibit information from entering the counter priority cells via XLINK, therefore the excessive rate of XLINKO is not detected. In check number four the states of Bits 5 and 6 of Channel 13 and Bit 10 of Channel 33 allows information to be gated into the INLINK circuitry via XLINK and at this time the excessive rate of XLINKO is detected generating INLINK TOO FAST and setting Channel 33 Bit 11 to zero.

TEST 1 (Locations 3, 1460-3, 1570)

This test checks that OUT COUNTERS 50 through 54 are diminished by instruction DINC when the proper bit is written into Channel 14. This is accomplished by the wiring of test cable W263 which connects the interface signals generated by instruction DINC into circuits which request counter increments. See Table 1.

Numbers are placed in Counters 50-54 in 1's complement. Results appear in Counters 32-36 in 2's complement form. The CDU-DP or M signals are generated until the contents of the OUT COUNTER are diminished to minus zero. At this time the channel bit which was requesting the DINC instruction is reset and checked.

In this routine each counter pair, 32 + x, 50 + x (x = 0 to X = 4) is tested separately. Four tests are performed on each pair with the expected results shown below. (Initially 32 + x is set to -30_{10}).

The following numbers are placed in 50 + x.	The corresponding 32 + x values should become
$+30_{10}$	+0
$+30_{10}$	$+30_{10}$
-30_{10} (1's complement)	+0
-30_{10})1's complement)	-30 (2's complement)

When performing a trial, after one of the above numbers is placed on 50+x and its corresponding drive bit set, the program waits until the drive bit resets and then checks 32+x for the expected result. In order to avoid an endless loop in the case of the drive bit not resetting, a time limiting loop has been incorporated. If the drive bit does not reset within the given time (approximately 10 msec) the test fails.

Table 1

Load Ch. 14 Bit	DINC OUTCTR	If Contents of OUTCTR is	Generate Interface Signal	This is Wired Into	Causes Counter Request
16/15	50	Positive	CDUXDP	CDUXP	PCDU 32
	50	Negative	CDUXDM	CDUXM	MCDU 32
14	51	Positive	CDUYDP	CDUYP	PCDU 33
	51	Negative	CDUYDM	CDUYM	MCDU 33
13	52	Positive	CDUZDP	CDUZP	PCDU 34
	52	Negative	CDUZDM	CDUZM	MCDU 34
12	53	Positive	TRNDP	TRNP	PCDU 35
	53	Negative	TRNDM	TRNM	MCDU 35
11	54	Positive	SHFTDP	SHAFTP	PCDU 36
	54	Negative	SHFTDM	SHAFTM	MCDU 36

TEST 2 (Locations 3, 1571-4, 1400)

This test checks the operation of the radar control codes associated with Bits 1 through 4 of Channel 13. This is accomplished by using the decoded radar signals to generate increment requests for BMAG counters 42, 43 and 44. Bit 8 of Channel 13 is tested also since the counter requests which are generated at the interface module must pass through circuitry which is enabled by this bit position.

Events listed in Table 2 occur when a code is entered into the lower 4 Bits of Channel 13.

The radar signals are generated at a 3200 cycle/second rate for a period of 90 ms. This results in the generation of 256 pulses each time a code is entered into Channel 13. Initially, in this test, counters 42-44 are set to +0 and three tests are performed with each radar code and Bit 8 of Channel 13 set. In the case of codes 11, 14 and 16 the proper counter is initialized at -400. The first request should PINC the counter to -0. The second request with the same code should PINC the counter to +400. The counter is then re-initialized to 37777. After the next request, with the same code, it should read +377.

In the case of codes 12, 15 and 17, the proper counter is initialized at +400. The first request should MINC the counter to -0. The second request of the same code should MINC it to -377. It is then set to 40400. After the next request of the same code it should read 40000.

A test is performed with each radar code and Bit 8 of Channel 13 reset to ascertain that the counter accessed will not change in value. The program periodically checks that no counter has changed from +0 other than the one to which a request is sent. When Bit 4 in Channel 13 is reset, the program knows that the proper counter should contain the expected value. A timing loop has been incorporated to prevent an endless loop from occurring in the event Bit 4 of Channel 13 was not reset. The no signal codes (10 and 13) are used to check that no signals are generated to any counter.

TEST 3 (Locations 4, 1400-4, 1470)

This test checks that Bit 1 of Channel 14 controls the OUTLINK circuitry and that this circuitry is operating properly. Bit 1 of Channel 14 generates a flag bit for the OUTLINK data which causes the computer to serially shift the 15 bits of OUTLINK data out of Counter 57. Each of the 16 bits

Table 2

Ch. 13 Code 4 3 2 1	Radar Signal Generated	Counter Request Generated	Type of Increment Requested	On CTR#
1 0 0 0	None	None	None	None
1 0 0 1	RR RANG	BMGXP	PINC	42
1 0 1 0	RR RARA	BMGXM	MINC	42
1 0 1 1	None	None	None	None
1 1 0 0	LRSVEL	BMGYP	PINC	43
1 1 0 1	LRYVEL	BMGYM	MINC	43
1 1 1 0	LRZVEL	BMGZP	PINC	44
1 1 1 1	LR RANG	BMGZM	MINC	44

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will generate either an OTLNK1 or OTLNK0 signal in the Interface Module depending on whether data bit was a "1" or a "0" respectively. These signals are then used to generate SHINC and SHANC instructions for the UPLINK counter.

OTLNK1 causes UPLINK1 which requests a SHANC on Counter 45.

OTLINK0 causes UPLINK0 which requests a SHINC on Counter 45.

This causes the data of Counter 57 to be duplicated in Counter 45.

Bits 5 and 6 of Channel 13 are also incorporated in this test since they control the inhibit or enable status of the UPLINK counter.

Four checks are performed here. They are -

1. a. Set Channel 13 Bits 5 and 6 to 00.
   b. Set Counter 57 to 25252 Counter 45= 0, and Channel 14 Bit 1=1.
   c. Wait a maximum of 10 ms for Channel 14 Bit 1 to reset. If it has not reset within this time, test fails.
   d. Delay 5 more ms.
   e. Check that Counter 45 now contains 25252. If not, Fail.

2. a. Set Channel 13 Bits 6 and 5 to 10 (INHIBIT UPLINK).
   b. Set Counter 57 to 25252, Counter 45= 0 and Channel 14 Bit 1=1.
   c. Wait a maximum of 10 ms for Channel 14 Bit 1 to reset. If it has not reset within this time, test fails.
   d. Delay 5 more ms.
   e. Check that Counter 45 still contains 0. If not, Fail.

3. Same as 1 above except set CTR 57 to 52525 in step b. and expect 52525 in CTR 45 in step e.

4. Same as 2 above except set CTR 57 to 52525 in step b.

TEST 4 (Locations 4, 1471-4, 1650)

This test checks that Bits 2 and 3 of Channel 14 control the altitude meter circuitry and that this circuitry is operating properly. Bit 3 of Channel 14 generates a flag bit for the ALTITUDE METER data which causes the computer to serially shift the 15 data bits of ALTITUDE METER data out of Counter 60. Bit 2 selects the data transmission paths.

Bit 2	Data Bit	Transmit Via
0	0	ALTO
	1	ALT1
	0	ALRTO
1	1	ALRT1

The test wiring at the interface is such that -

ALTO causes RRINO,
ALT1 causes RRIN1,

ALRTO causes LRINO,
ALRT1 causes LRIN1,

The RR and LR signals will be converted to counter requests for SHINC and SHANC operations on Counter 46 when a radar code is loaded into Channel 13.

The test functions performed are listed in Table 3 below.

There are two checks made for each code listed for Channel 13. In the first check Counter 60 is loaded with an odd bit configuration, in the second check Counter 60 is loaded with an even bit configuration. The two results are then added and the answer checked for minus zero. Where no data is expected the answer is checked for positive zero.

Table 3

Load Ch. 14 Bits	Load Ch. 13 Bits	Data Expected in Counter 46
3 2	4 3 2 1	
1 0	1 0 0 0	None
	1 0 0 1	Duplicate of Counter 60
	1 0 1 0	Duplicate of Counter 60
1 1	1 0 0 0	None
	1 1 0 0	Duplicate of Counter 60
	1 1 0 1	Duplicate of Counter 60
	1 1 1 0	Duplicate of Counter 60
	1 1 1 1	Duplicate of Counter 60

The second check tests for the generation of the flag bit from the ALTITUDE METER circuitry. This check consists of loading Counter 60 with a plus one and waiting until this bit has been shifted one place to the left. At this time Counter 46 is checked to see that it contains the same information.

TEST 5 (Locations 4, 1651-4, 1740)

This test checks that out Counter 55 and 56 are diminished by instruction DINC when the proper bit is written into Channel 14. This is accomplished by test wiring the interface signals generated during instruction DINC into circuits which request counter increments. The counter requests generated are listed in Table 4 below.

Bit 8 of Channel 13 is also used since it enables the counter requests to be gated into the counter cells.

Following is a list of tests actually performed.

a. 1. Write 1 into Channel 13 Bit 8.
   2. Zero CTR 42 (BMAGX), Zero CTR 43 (BMAGY).
   3. Deposit 00377 into CTR 55.
   4. Set Channel 14 Bits 5, 4 = 01.
   5. Wait until Channel 14 bit resets (100 ms is allowed).
   6. Does CTR 42 = 00377? If not, error.

b. Same as a. except 77400 CTR 55 (step 2) and 77400 will be expected on CTR 42 (step 6).

c. 1. Write 1 into Channel 13 Bit 8.
   2. Zero CTR 42, Zero CTR 43.
   3. Deposit 00377 into CTR 56.
   4. Set Channel 14 Bits 5, 4 = 10.
   5. Wait until Channel 14 bit resets (100 ms is allowed).
   6. Does CTR 43 = 00377? If not, error.

d. Same as c. except 77400 is deposited in CTR 56 (step 2) and 774008 will be expected on CTR 43 (step 6).

TEST STARTP (Locations 5, 1400-5, 1720)

This test is designed to check the decoding circuitry of Downlink Channels 34 and 35. The Downlink circuitry consists of Channels 34 and 35 (which contain the information to be transmitted), a 5-stage counter (whose

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Table 4

Load Ch. 14 Bit	DINC OUTCTR	If Contents of OUTCTR is	Generate Interface Signal	This is Wired Into	Causes CTR Request
4	55	Positive	+THRST	BMGXP	PINC 42
	55	Negative	-THRST	BMGXM	MINC 42
5	56	Positive	+EMS	BMGYP	PINC 43
	56	Negative	-EMS	BMGYM	MINC 43

outputs are decoded to gate out one bit of information at a time), and signals DKBSNC, and DKSTRT. DKBSNC enables the output channels and causes the 5-stage counter to be "incremented." The other signal, DKSTRT, resets the 5-stage counter. Bit 7 of Channel 13, the "flag bit" for the Downlink data, is gated out by signal DKBSNC when the 5-stage counter is in the zero state. The outputs from the 5-stage counter are decoded and function as follows; stages 4 and 5 divide Channels 34 and 35 into four 8 bit sections, stage 1, 2 and 3 are decoded to enable a single bit from an 8 bit section to be transmitted. Bit 16 is the first bit transmitted from a channel while the parity bit is the last bit transmitted. Channel 34 is transmitted before Channel 35.

Following is a list of interface connections used to generate the required Downlink signals.

GYRRST causes	DKSTRT	which resets the 5-stage counter
GYRSET causes	DKBSNC	which steps the counter
DKDATA causes	XLINK1	which allows the Downlink output bits to be stored in Counter 45 (INLINK).

GYRRST and GYRSET are controlled by Bit 10 of Channel 14 and the contents of out Counter 47 GYROD. The number of times signal GYRSET is generated is determined by the contents of Counter 47. Signal GYRRST is generated whenever GYRSET is not. Both occur at a frequency of 3200 cps.

Following is a list of checks performed within this test. The first Check below proves that only one of the four 8 bit sections is active and that it is the proper one.

C(34)	C(35)	# BITSYNC'S Generated	C(45)
00177	77777	9	00000

The three checks below plus the first test of the next group are sufficient to prove that multiple decoding is not present within the eight bit section.

37600	77777	2	00000
17600	77777	3	00000
07600	77777	4	00000

The eight checks below prove that the lower 3 stages of the 5 stages are decoding properly and that each of eight states is capable of gating a data bit out of Channel 34.

40000	77777	5	00001
37600	77777	3	00001
17600	77777	4	00001

C(34)	C(35)	# BITSYNC'S Generated	C(45)
07600	77777	5	00001
03600	77777	6	00001
01600	77777	7	00001
00600	77777	8	00001
00200	77777	9	00001

The three checks below prove that the remaining three states of stages 4 and 5 are getting decoded properly and activate the proper 8 bit section.

*10000	77777	17	00000
10100	*10177	25	00000
10100	*10000	33	00000

The three checks below show that each of the bits within an 8 bit section is capable of being transmitted.

*40177	10000	17	00000
*40000	77600	25	00377
40000	*40177	33	00377

*The input Counter 45 is inhibited until the position being interrogated is beyond this point.

The last check performed in this section sets Channel 34 and 35 to zero, sets Bit 7 of Channel 13 to a one and generates two BITSYNC pulses. Counter 45 is checked for 1 pulse, if this test is successful Bit 7 of Channel 13 is functioning properly.

TEST STPIP (Locations 6, 1400-6, 1562)

This test checks the GYRO signals controlled by Channel 14, Bits 7 through 10, and the associated circuitry of PIPA Counters 37, 40 and 41.

The interface connections are listed in Table 5 below.

Ordinarily this signal pairing would not function properly, since the GYRO signals (occuring at a 102.4 KC rate) are gated by computer timing signal SB1, whereas the PIPA counter increments are generated during SBZ time. The problem was solved by inverting the counter increment requests generated by the GYRO signals. Physically this was accomplished by wiring the high side of GYRO output transformer to the low side of the PIPA input transformer. Computer signal PIPSAM then converted the 102.4 KC GYRO signals to 3200 KC counter increment requests for the three PIPA counters.

The PIPA counter increment requests are controlled by a circuit which rejects the first three consecutive pulses of one type, i.e., the first three PINC requests or three MINC requests. In order to check that all of the above circuitry is functioning properly the following tests are made for each code which is entered into Channel 14.

a. Enter a code into Channel 14 which will pre-condition the PIPA circuits so that the first three counter increment requests generated by the test code will be rejected.

b. Enter the code to be tested into Channel 14.

c. When Bit 10 of Channel 14 gets reset, go check the counter which was to be incremented for the proper number of pulses.

d. Then check that the other two counters contain positive zero, that is, they did not receive any pulses.

e. The number of pulses gated out for each test is octal 103. The counter being tested is checked for octal 100.

f. In the case of the two illegal codes, all three counters are checked for positive zero.

The term pre-condition implies that if the code to be tested will cause PINCS on a counter, the code which MINCS the same counter will be used to set the PIPA rejection circuit to

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a known state. Therefore the first three positive increment requests will be rejected. The reverse is also true when the MINC codes for each counter are tested.

Table 5

Load Ch. 14 10 9 8 7	Generate Signal	Causes Counter Request
1 0 0 0	None	None
1 0 0 1	GYXP	PINC 37
1 0 1 0	GYYP	PINC 40
1 0 1 1	GYZP	PINC 41
1 1 0 0	None	None
1 1 0 1	GYXM	MINC 37
1 1 1 0	GYYM	MINC 40
1 1 1 1	GYZM	MINC 41

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05781
REV. A
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM IN-OUT CHECKS

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
16	REG SEL displays success indication 70707 alternating with 07070	1111 000 111 000 111 alt. w/ 0000 111 000 111 000	______

JOB OPERATING PROCEDURE FOR (FVP)
PROGRAM IN-OUT CHECKS

JDC 05781 REV. B PAGE 1 OF 10
INITIAL TDRR 32809 D.S. PGS 1

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

The IN-OUT Program contains eight individual test routines, identified as STARTP, STPIP, and TEST 1 through TEST 6. The tests are performed sequentially starting with TEST 6, followed by TEST 1 through 5. STARTP, STPIP. A description of each test is provided under the Program Analysis section included at the end of this JDC The sequence of testing is also shown in the Flowchart of Figure 1.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	10-20-67	34890	1, 3	-	EA/??	-
B	3-23-68	35898	3	-	EA/90	-

REFERENCES JDC's 05406, 05407, 05412
05413, 05414
ND's 1021042, 1021043

IMPORTANT Do not attempt to perform this test until step 1 of this JDC has been verified

INTERVAL As required

TOOLS AND MATERIAL Program IN-OUT CHECKS
Mylar Tape, JDC 05782

PREPARATION

1. Connect test cable W263 to connectors J4, J5, J7, and J8 of the AGC-OC. Cable W263 is supplied as part of the SUBSYSTEM TEST INTERCONNECTION SET under the Part Number 2016314-011.

2. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

3. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel.

4. Load Program IN-OUT CHECKS (JDC 05782) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

5. Rewind Tape.

6. Verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).

7. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

8. Press the CH33-10 indicator switch on the RDC INTERFACE Panel to the on . (illuminated) position.

OPERATION

9. Transfer Control to E Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

VERIFICATION WITH SIDL REQUIRED BEFORE USE

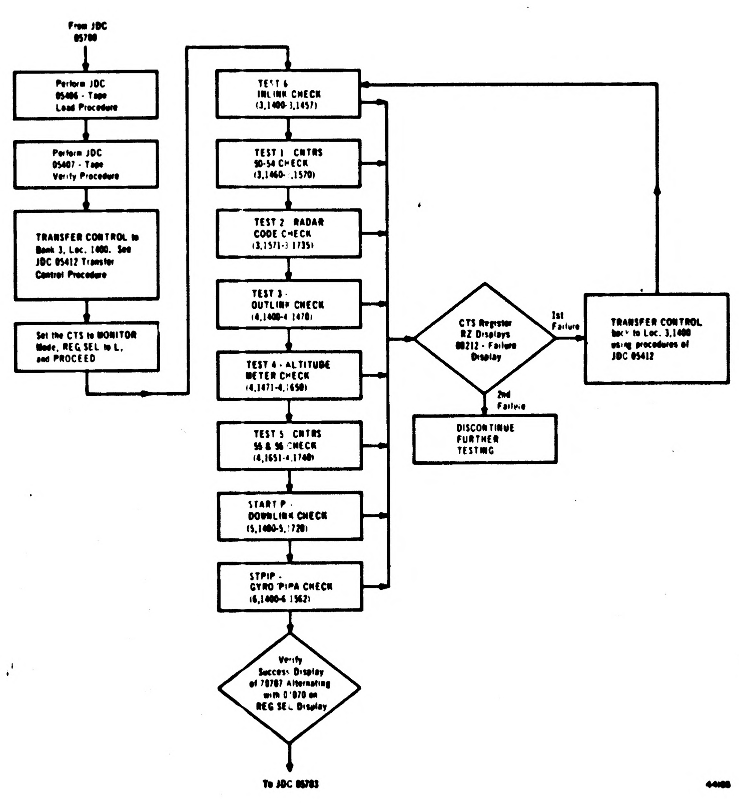
From JDC 05780
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 - Tape Verify Procedure
TRANSFER CONTROL to Bank 3, Loc. 1400. See JDC 05412 Transfer Control Procedure
Set the CTS to MONITOR Mode, REG SEL to L, and PROCEED
TEST 6 INLINK CHECK (3,1400-3,1457)
TEST 1 CNTRS 50-54 CHECK (3,1460-3,1570)
TEST 2 RADAR CODE CHECK (3,1571-3,1735)
TEST 3 - OUTLINK CHECK (4,1400-4,1470)
TEST 4 - ALTITUDE METER CHECK (4,1471-4,1650)
TEST 5 CNTRS 55 & 56 CHECK (4,1651-4,1740)
START P - DOWNLINK CHECK (5,1400-5,1720)
STPIP - GYRO PIPA CHECK (6,1400-6,1562)
Verify Success Display of 70707 Alternating with 07070 on REG SEL Display
To JDC 05783
CTS Register RZ Displays 00212 - Failure Display
1st Failure
TRANSFER CONTROL back to Loc. 3,1400 using procedures of JDC 05412
2nd Failure
DISCONTINUE FURTHER TESTING
44108

Figure 1. Flowchart for Performing Program IN-OUT CHECKS

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10. Press the MONITOR indicator switch to the on (illuminated) position.

11. Press the CL Key.

12. Set the register select switch to position L.

13. Set the INHIBIT INCREMENTS switch to the OFF position.

14. Set the T12 COUNTER STOP switch to the OFF position.

15. Press the PROCEED button.

16. No further operator control is required to complete the eight checks. Checks are performed sequentially under program control. The program will be automatically terminated in either a success display or a stop display. If the test is successful Register L on the Programmer and Monitor Panel will display 70707 alternating with 07070. If the test fails to complete anyone of the eight Checks, Register Z will display the address 0212, and Register A will display the return address (to the main program).

If the test terminates in a failure, Transfer Control (using the procedures of JDC 05412) back to Location 3, 1400, and PROCEED. If the test fails again discontinue further testing, and note the contents of Register A (return address). Compare this address with the address groups of each of the eight test sequences. The "failed" address should fall within one of these groupings. The specific test functions unable to be performed are determined by referencing the Program Analysis section for a description of the "failed" test.

17. Press the CH33-10 indicator switch on the RDC Interface Panel to the OFF (extinguished) position. After completion of this JDC, remove test cable W263 (Part No. 2016314-011) installed in step 1 and reconnect the cables that were removed from J4, J5, J7, and J8.

PROGRAM ANALYSIS

TEST 6 (Locations 3, 1400-3, 1457)

This test checks the decoding circuitry controlled by bits 5 and 6 of channel 13. Bits 5 and 6 are decoded to control information gated into the UPLINK counter (by way of the counter priority cells) from either of two sources, interface signals UPLINK or CROSSLINK. It also checks that the circuit used for detecting excessive rates of information flow from these two sources is operative. Excessive data rate is indicated by the INLINK TOO FAST bit of channel 33 when an excessive rate is detected. The INLINK TOO FAST function is tested by using bit 6 of channel 14 to generate signal GYENAB and making the interface connection such that GYENAB causes XLINK0. The frequency of GYENAB is approximately 102 KC. The test bit configurations are listed as follows·

Set Ch. 13 Bits 6 5	Set Ch. 14 Bit 6	In Ch. 33 Bit 11
		Look for a
0 0	1	1
1 0	1	1
1 1	1	1
0 1	1	0

The bits of channel 33 are inverted. Therefore bit 11 will be a one until the INLINK TOO FAST signal is present. In checks one through three Bit 5 of Channel 13 and Bit 10 of Channel 33 inhibit information from entering the counter priority cells via XLINK, therefore the excessive rate of XLINK0 is not detected. In check number four the states of Bits 5 and 6 of Channel 13 and Bit 10 of Channel 33 allows information to be gated into the INLINK circuitry via XLINK and at this time the excessive rate of XLINK0 is detected generating INLINK TOO FAST and setting Channel 33 Bit 11 to zero.

TEST 1 (Locations 3, 1460-3, 1570)

This test checks that OUT COUNTERS 50 through 54 are diminished by instruction DINC when the proper bit is written into Channel 14. This is accomplished by the wiring of test cable W263 which connects the interface signals generated by instruction DINC into circuits which request counter increments. See Table 1.

Numbers are placed in Counters 50-54 in 1's complement. Results appear in Counters 32-36 in 2's complement form. The CDU-DP or M signals are generated until the contents of the OUT COUNTER are diminished to minus zero. At this time the channel bit which was requesting the DINC instruction is reset and checked.

In this routine each counter pair, 32 + x, 50 + x (x = 0 to X = 4) is tested separately. Four tests are performed on each pair with the expected results shown below. (Initially 32 + x is set to -30_{10}).

The following numbers are placed in 50 + x.	The corresponding 32 + x values should become
$+30_{10}$	+0
$+30_{10}$	$+30_{10}$
-30_{10} (1's complement)	+0
-30_{10})1's complement)	-30 (2's complement)

When performing a trial, after one of the above numbers is placed on 50+x and its corresponding drive bit set, the program waits until the drive bit resets and then checks 32+x for the expected result. In order to avoid an endless loop in the case of the drive bit not resetting, a time limiting loop has been incorporated. If the drive bit does not reset within the given time (approximately 10 msec) the test fails.

Table 1

Load Ch. 14 Bit	DINC OUTCTR	If Contents of OUTCTR is	Generate Interface Signal	This is Wired Into	Causes Counter Request
16/15	50	Positive	CDUXDP	CDUXP	PCDU 32
	50	Negative	CDUXDM	CDUXM	MCDU 32
14	51	Positive	CDUYDP	CDUYP	PCDU 33
	51	Negative	CDUYDM	CDUYM	MCDU 33
13	52	Positive	CDUZDP	CDUZP	PCDU 34
	52	Negative	CDUZDM	CDUZM	MCDU 34
12	53	Positive	TRNDP	TRNP	PCDU 35
	53	Negative	TRNDM	TRNM	MCDU 35
11	54	Positive	SHFTDP	SHAFTP	PCDU 36
	54	Negative	SHFTDM	SHAFTM	MCDU 36

TEST 2 (Locations 3, 1571-4, 1400)

This test checks the operation of the radar control codes associated with Bits 1 through 4 of Channel 13. This is accomplished by using the decoded radar signals to generate increment requests for BMAG counters 42, 43 and 44. Bit 8 of Channel 13 is tested also since the counter requests which are generated at the interface module must pass through circuitry which is enabled by this bit position.

Events listed in Table 2 occur when a code is entered into the lower 4 Bits of Channel 13.

The radar signals are generated at a 3200 cycle/second rate for a period of 90 ms. This results in the generation of 256 pulses each time a code is entered into Channel 13. Initially, in this test, counters 42-44 are set to +0 and three tests are performed with each radar code and Bit 8 of Channel 13 set. In the case of codes 11, 14 and 16 the proper counter is initialized at -400. The first request should PINC the counter to -0. The second request with the same code should PINC the counter to +400. The counter is then re-initialized to 37777. After the next request, with the same code, it should read +377.

In the case of codes 12, 15 and 17, the proper counter is initialized at +400. The first request should MINC the counter to -0. The second request of the same code should MINC it to -377. It is then set to 40400. After the next request of the same code it should read 40000.

A test is performed with each radar code and Bit 8 of Channel 13 reset to ascertain that the counter accessed will not change in value. The program periodically checks that no counter has changed from +0 other than the one to which a request is sent. When Bit 4 in Channel 13 is reset, the program knows that the proper counter should contain the expected value. A timing loop has been incorporated to prevent an endless loop from occurring in the event Bit 4 of Channel 13 was not reset. The no signal codes (10 and 13) are used to check that no signals are generated to any counter.

TEST 3 (Locations 4, 1400-4, 1470)

This test checks that Bit 1 of Channel 14 controls the OUTLINK circuitry and that this circuitry is operating properly. Bit 1 of Channel 14 generates a flag bit for the OUTLINK data which causes the computer to serially shift the 15 bits of OUTLINK data out of Counter 57. Each of the 16 bits

Table 2

Ch. 13 Code 4 3 2 1	Radar Signal Generated	Counter Request Generated	Type of Increment Requested	On CTR#
1 0 0 0	None	None	None	None
1 0 0 1	RR RANG	BMGXP	PINC	42
1 0 1 0	RR RARA	BMGXM	MINC	42
1 0 1 1	None	None	None	None
1 1 0 0	LRSVEL	BMGYP	PINC	43
1 1 0 1	LRYVEL	BMGYM	MINC	43
1 1 1 0	LRZVEL	BMGZP	PINC	44
1 1 1 1	LR RANG	BMGZM	MINC	44

will generate either an OTLNK1 or OTLNK0 signal in the Interface Module depending on whether data bit was a "1" or a "0" respectively. These signals are then used to generate SHINC and SHANC instructions for the UPLINK counter.

OTLNK1 causes UPLINK1 which requests a SHANC on Counter 45.

OTLINK0 causes UPLINK0 which requests a SHINC on Counter 45.

This causes the data of Counter 57 to be duplicated in Counter 45.

Bits 5 and 6 of Channel 13 are also incorporated in this test since they control the inhibit or enable status of the UPLINK counter.

Four checks are performed here. They are -

1. a. Set Channel 13 Bits 5 and 6 to 00.
   b. Set Counter 57 to 25252 Counter 45= 0, and Channel 14 Bit 1=1.
   c. Wait a maximum of 10 ms for Channel 14 Bit 1 to reset. If it has not reset within this time, test fails.
   d. Delay 5 more ms.
   e. Check that Counter 45 now contains 25252. If not, Fail.

2. a. Set Channel 13 Bits 6 and 5 to 10 (INHIBIT UPLINK).
   b. Set Counter 57 to 25252, Counter 45= 0 and Channel 14 Bit 1=1.
   c. Wait a maximum of 10 ms for Channel 14 Bit 1 to reset. If it has not reset within this time, test fails.
   d. Delay 5 more ms.
   e. Check that Counter 45 still contains 0. If not, Fail.

3. Same as 1 above except set CTR 57 to 52525 in step b. and expect 52525 in CTR 45 in step e.

4. Same as 2 above except set CTR 57 to 52525 in step b.

TEST 4 (Locations 4, 1471-4, 1650)

This test checks that Bits 2 and 3 of Channel 14 control the altitude meter circuitry and that this circuitry is operating properly. Bit 3 of Channel 14 generates a flag bit for the ALTITUDE METER data which causes the computer to serially shift the 15 data bits of ALTITUDE METER data out of Counter 60. Bit 2 selects the data transmission paths.

Bit 2	Data Bit	Transmit Via
0	0	ALTO
	1	ALT1
	0	ALRTO
1	1	ALRT1

The test wiring at the interface is such that -

ALTO causes RRINO,
ALT1 causes RRIN1,

ALRTO causes LRINO,
ALRT1 causes LRIN1,

The RR and LR signals will be converted to counter requests for SHINC and SHANC operations on Counter 46 when a radar code is loaded into Channel 13.

The test functions performed are listed in Table 3 below.

There are two checks made for each code listed for Channel 13. In the first check Counter 60 is loaded with an odd bit configuration, in the second check Counter 60 is loaded with an even bit configuration. The two results are then added and the answer checked for minus zero. Where no data is expected the answer is checked for positive zero.

Table 3

Load Ch. 14 Bits	Load Ch. 13 Bits	Data Expected in Counter 46
3 2	4 3 2 1	
1 0	1 0 0 0	None
	1 0 0 1	Duplicate of Counter 60
	1 0 1 0	Duplicate of Counter 60
1 1	1 0 0 0	None
	1 1 0 0	Duplicate of Counter 60
	1 1 0 1	Duplicate of Counter 60
	1 1 1 0	Duplicate of Counter 60
	1 1 1 1	Duplicate of Counter 60

The second check tests for the generation of the flag bit from the ALTITUDE METER circuitry. This check consists of loading Counter 60 with a plus one and waiting until this bit has been shifted one place to the left. At this time Counter 46 is checked to see that it contains the same information.

TEST 5 (Locations 4, 1651-4, 1740)

This test checks that out Counter 55 and 56 are diminished by instruction DINC when the proper bit is written into Channel 14. This is accomplished by test wiring the interface signals generated during instruction DINC into circuits which request counter increments. The counter requests generated are listed in Table 4 below.

Bit 8 of Channel 13 is also used since it enables the counter requests to be gated into the counter cells.

Following is a list of tests actually performed.

a. 1. Write 1 into Channel 13 Bit 8.
   2. Zero CTR 42 (BMAGX), Zero CTR 43 (BMAGY).
   3. Deposit 00377 into CTR 55.
   4. Set Channel 14 Bits 5, 4 = 01.
   5. Wait until Channel 14 bit resets (100 ms is allowed).
   6. Does CTR 42 = 00377? If not, error.

b. Same as a. except 77400 CTR 55 (step 2) and 77400 will be expected on CTR 42 (step 6).

c. 1. Write 1 into Channel 13 Bit 8.
   2. Zero CTR 42, Zero CTR 43.
   3. Deposit 00377 into CTR 56.
   4. Set Channel 14 Bits 5, 4 = 10.
   5. Wait until Channel 14 bit resets (100 ms is allowed).
   6. Does CTR 43 = 00377? If not, error.

d. Same as c. except 77400 is deposited in CTR 56 (step 2) and 774008 will be expected on CTR 43 (step 6).

TEST STARTP (Locations 5, 1400-5, 1720)

This test is designed to check the decoding circuitry of Downlink Channels 34 and 35. The Downlink circuitry consists of Channels 34 and 35 (which contain the information to be transmitted), a 5-stage counter (whose

Table 4

Load Ch. 14 Bit	DINC OUTCTR	If Contents of OUTCTR is	Generate Interface Signal	This is Wired Into	Causes CTR Request
4	55	Positive	+THRST	BMGXP	PINC 42
	55	Negative	-THRST	BMGXM	MINC 42
5	56	Positive	+EMS	BMGYP	PINC 43
	56	Negative	-EMS	BMGYM	MINC 43

outputs are decoded to gate out one bit of information at a time), and signals DKBSNC, and DKSTRT. DKBSNC enables the output channels and causes the 5-stage counter to be "incremented." The other signal, DKSTRT, resets the 5-stage counter. Bit 7 of Channel 13, the "flag bit" for the Downlink data, is gated out by signal DKBSNC when the 5-stage counter is in the zero state. The outputs from the 5-stage counter are decoded and function as follows; stages 4 and 5 divide Channels 34 and 35 into four 8 bit sections, stage 1, 2 and 3 are decoded to enable a single bit from an 8 bit section to be transmitted. Bit 16 is the first bit transmitted from a channel while the parity bit is the last bit transmitted. Channel 34 is transmitted before Channel 35.

Following is a list of interface connections used to generate the required Downlink signals.

GYRRST causes	DKSTRT	which resets the 5-stage counter
GYRSET causes	DKBSNC	which steps the counter
DKDATA causes	XLINK1	which allows the Downlink output bits to be stored in Counter 45 (INLINK).

GYRRST and GYRSET are controlled by Bit 10 of Channel 14 and the contents of out Counter 47 GYROD. The number of times signal GYRSET is generated is determined by the contents of Counter 47. Signal GYRRST is generated whenever GYRSET is not. Both occur at a frequency of 3200 cps.

Following is a list of checks performed within this test. The first Check below proves that only one of the four 8 bit sections is active and that it is the proper one.

C(34)	C(35)	# BITSYNC'S Generated	C(45)
00177	77777	9	00000

The three checks below plus the first test of the next group are sufficient to prove that multiple decoding is not present within the eight bit section.

37600	77777	2	00000
17600	77777	3	00000
07600	77777	4	00000

The eight checks below prove that the lower 3 stages of the 5 stages are decoding properly and that each of eight states is capable of gating a data bit out of Channel 34.

40000	77777	5	00001
37600	77777	3	00001
17600	77777	4	00001

C(34)	C(35)	# BITSYNC'S Generated	C(45)
07600	77777	5	00001
03600	77777	6	00001
01600	77777	7	00001
00600	77777	8	00001
00200	77777	9	00001

The three checks below prove that the remaining three states of stages 4 and 5 are getting decoded properly and activate the proper 8 bit section.

*10000	77777	17	00000
10100	*10177	25	00000
10100	*10000	33	00000

The three checks below show that each of the bits within an 8 bit section is capable of being transmitted.

*40177	10000	17	00000
*40000	77600	25	00377
40000	*40177	33	00377

*The input Counter 45 is inhibited until the position being interrogated is beyond this point.

The last check performed in this section sets Channel 34 and 35 to zero, sets Bit 7 of Channel 13 to a one and generates two BITSYNC pulses. Counter 45 is checked for 1 pulse, if this test is successful Bit 7 of Channel 13 is functioning properly.

TEST STPIP (Locations 6, 1400-6, 1562)

This test checks the GYRO signals controlled by Channel 14, Bits 7 through 10, and the associated circuitry of PIPA Counters 37, 40 and 41.

The interface connections are listed in Table 5 below.

Ordinarily this signal pairing would not function properly, since the GYRO signals (occuring at a 102.4 KC rate) are gated by computer timing signal SB1, whereas the PIPA counter increments are generated during SBZ time. The problem was solved by inverting the counter increment requests generated by the GYRO signals. Physically this was accomplished by wiring the high side of GYRO output transformer to the low side of the PIPA input transformer. Computer signal PIPSAM then converted the 102.4 KC GYRO signals to 3200 KC counter increment requests for the three PIPA counters.

The PIPA counter increment requests are controlled by a circuit which rejects the first three consecutive pulses of one type, i.e., the first three PINC requests or three MINC requests. In order to check that all of the above circuitry is functioning properly the following tests are made for each code which is entered into Channel 14.

a. Enter a code into Channel 14 which will pre-condition the PIPA circuits so that the first three counter increment requests generated by the test code will be rejected.

b. Enter the code to be tested into Channel 14.

c. When Bit 10 of Channel 14 gets reset, go check the counter which was to be incremented for the proper number of pulses.

d. Then check that the other two counters contain positive zero, that is, they did not receive any pulses.

e. The number of pulses gated out for each test is octal 103. The counter being tested is checked for octal 100.

f. In the case of the two illegal codes, all three counters are checked for positive zero.

The term pre-condition implies that if the code to be tested will cause PINCS on a counter, the code which MINCS the same counter will be used to set the PIPA rejection circuit to

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a known state. Therefore the first three positive increment requests will be rejected. The reverse is also true when the MINC codes for each counter are tested.

Table 5

Load Ch. 14 10 9 8 7	Generate Signal	Causes Counter Request
1 0 0 0	None	None
1 0 0 1	GYXP	PINC 37
1 0 1 0	GYYP	PINC 40
1 0 1 1	GYZP	PINC 41.
1 1 0 0	None	None
1 1 0 1	GYXM	MINC 37
1 1 1 0	GYYM	MINC 40
1 1 1 1	GYZM	MINC 41

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 05781
REV. B
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM IN-OUT CHECKS

ASSEMBLY UNDER TEST	TEST HISTORY
TITLE ______	DATE ______ START ______ END ______ SITE / LOCATION
SER. NO. ______ DWG ______ REV. ______	TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
16	REG SEL displays success indication 70707 alternating with 07070	1111 000 111 000 111 alt. w/ 0000 111 000 111 000	______

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM IN-OUT CHECKS

JDC 05781 REV. — PAGE 1 OF 10
INITIAL TDRR 32809 D.S. PGS 1

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

The IN-OUT Program contains eight individual test routines, identified as STARTP, STPIP, and TEST 1 through TEST 6. The tests are performed sequentially starting with TEST 6, followed by TEST 1 through 5. STARTP. STPIP. A description of each test is provided under the Program Analysis section included at the end of this JDC The sequence of testing is also shown in the Flowchart of Figure 1.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA

REFERENCES JDC's 05406, 05407, 05412 05413, 05414
ND's 1021042, 1021043

IMPORTANT Do not attempt to perform this test until step 1 of this JDC has been verified

INTERVAL As required

TOOLS AND MATERIAL Program IN-OUT CHECKS Mylar Tape, JDC 05782

PREPARATION

1. Connect test cable W263 to connectors J4, J5, J7, and J8 of the AGC-OC. Cable W263 is supplied as part of the SUBSYSTEM TEST INTERCONNECTION SET under the Part Number 2016314-011.

2. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

3. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel.

4. Load Program IN-OUT CHECKS (JDC 05782) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

5. Rewind Tape.

6. Verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).

7. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

8. Press the CH33-10 indicator switch on the RDC INTERFACE Panel to the on (illuminated) position.

OPERATION

9. Transfer Control to Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ____

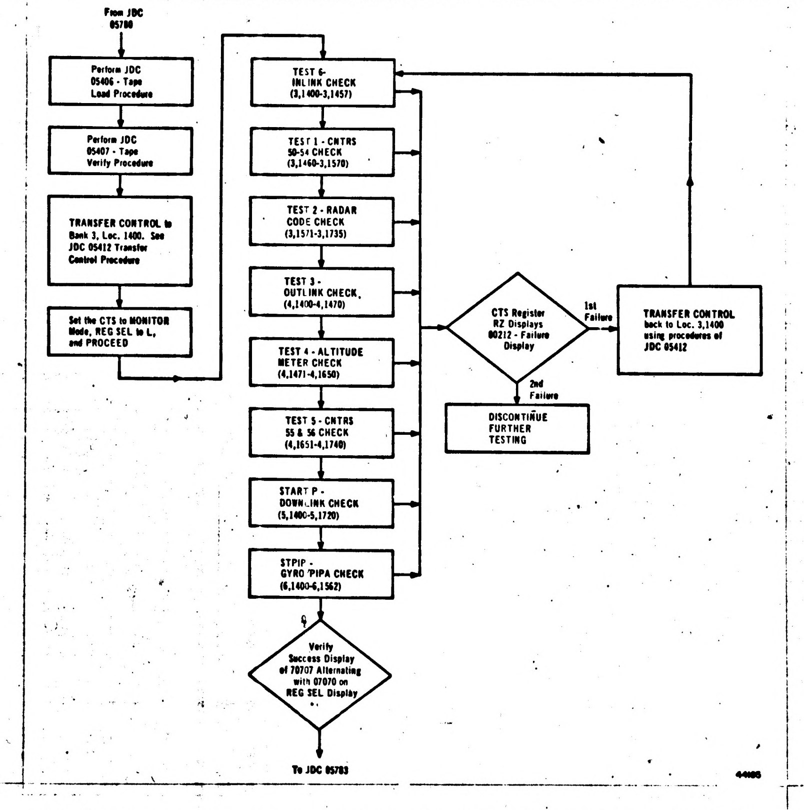
From JDC 05780
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 - Tape Verify Procedure
TRANSFER CONTROL to Bank 3, Loc. 1400. See JDC 05412 Transfer Control Procedure
Set the CTS to MONITOR Mode, REG SEL to L, and PROCEED
TEST 6 - INLINK CHECK (3,1400-3,1457)
TEST 1 - CNTRS 50-54 CHECK (3,1460-3,1570)
TEST 2 - RADAR CODE CHECK (3,1571-3,1735)
TEST 3 - OUTLINK CHECK, (4,1400-4,1470)
TEST 4 - ALTITUDE METER CHECK (4,1471-4,1650)
TEST 5 - CNTRS 55 & 56 CHECK (4,1651-4,1740)
START P - DOWNLINK CHECK (5,1400-5,1720)
STPIP - GYRO PIPA CHECK (6,1400-6,1562)
Verify Success Display of 70707 Alternating with 07070 on REG SEL Display
To JDC 05783
CTS Register RZ Displays 00212 - Failure Display
1st Failure
TRANSFER CONTROL back to Loc. 3,1400 using procedures of JDC 05412
2nd Failure
DISCONTINUE FURTHER TESTING
44085

Figure 1. Flowchart for Performing Program IN-OUT CHECKS

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10. Press the MONITOR indicator switch to the on (illuminated) position.

11. Press the CL Key.

12. Set the register select switch to position L.

13. Set the INHIBIT INCREMENTS switch to the OFF position.

14. Set the T12 COUNTER STOP switch to the OFF position.

15. Press the PROCEED button.

16. No further operator control is required to complete the eight checks. Checks are performed sequentially under program control. The program will be automatically terminated in either a success display or a stop display. If the test is successful Register L on the Programmer and Monitor Panel will display 70707 alternating with 07070. If the test fails to complete anyone of the eight Checks, Register Z will display the address 0212, and Register A will display the return address (to the main program).

If the test terminates in a failure, Transfer Control (using the procedures of JDC 05412) back to Location 3, 1400, and PROCEED. If the test fails again discontinue further testing, and note the contents of Register A (return address). Compare this address with the address groups of each of the eight test sequences. The "failed" address should fall within one of these groupings. The specific test functions unable to be performed are determined by referencing the Program Analysis section for a description of the "failed" test.

PROGRAM ANALYSIS

TEST 6 (Locations 3, 1400-3, 1457)

This test checks the decoding circuitry controlled by bits 5 and 6 of channel 13. Bits 5 and 6 are decoded to control information gated into the UPLINK counter (by way of the counter priority cells) from either of two sources, interface signals UPLINK or CROSSLINK. It also checks that the circuit used for detecting excessive rates of information flow from these two sources is operative. Excessive data rate is indicated by the INLINK TOO FAST bit of channel 33 when an excessive rate is detected. The INLINK TOO FAST function is tested by using bit 6 of channel 14 to generate signal GYENAB and making the interface connection such that GYENAB causes XLINK0. The frequency of GYENAB is approximately 102 KC. The test bit configurations are listed as follows·

Set Ch. 13 Bits 6 5	Set Ch. 14 Bit 6	In Ch. 33 Bit 11
		Look for a
0 0	1	1
1 0	1	1
1 1	1	1
0 1	1	0

The bits of channel 33 are inverted. Therefore bit 11 will be a one until the INLINK TOO FAST signal is present. In checks one through three Bit 5 of Channel 13 and Bit 10 of Channel 33 inhibit information from entering the counter priority cells via XLINK, therefore the excessive rate of XLINK0 is not detected. In check number four the states of Bits 5 and 6 of Channel 13 and Bit 10 of Channel 33 allows information to be gated into the INLINK circuitry via XLINK and at this time the excessive rate of XLINK0 is detected generating INLINK TOO FAST and setting Channel 33 Bit 11 to zero.

TEST 1 (Locations 3, 1460-3, 1570)

This test checks that OUT COUNTERS 50 through 54 are diminished by instruction DINC when the proper bit is written into Channel 14. This is accomplished by the wiring of test cable W263 which connects the interface signals generated by instruction DINC into circuits which request counter increments. See Table 1.

Numbers are placed in Counters 50-54 in 1's complement. Results appear in Counters 32-36 in 2's complement form. The CDU-DP or M signals are generated until the contents of the OUT COUNTER are diminished to minus zero. At this time the channel bit which was requesting the DINC instruction is reset and checked.

In this routine each counter pair, 32 + x, 50 + x (x = 0 to X = 4) is tested separately. Four tests are performed on each pair with the expected results shown below. (Initially 32 + x is set to -30_{10}).

The following numbers are placed in 50 + x.	The corresponding 32 + x values should become
$+30_{10}$	+0
$+30_{10}$	$+30_{10}$
-30_{10} (1's complement)	+0
-30_{10})1's complement)	-30 (2's complement)

When performing a trial, after one of the above numbers is placed on 50+x and its corresponding drive bit set, the program waits until the drive bit resets and then checks 32+x for the expected result. In order to avoid an endless loop in the case of the drive bit not resetting, a time limiting loop has been incorporated. If the drive bit does not reset within the given time (approximately 10 msec) the test fails.

Table 1

Load Ch. 14 Bit	DINC OUTCTR	If Contents of OUTCTR is	Generate Interface Signal	This is Wired Into	Causes Counter Request
16/15	50	Positive	CDUXDP	CDUXP	PCDU 32
	50	Negative	CDUXDM	CDUXM	MCDU 32
14	51	Positive	CDUYDP	CDUYP	PCDU 33
	51	Negative	CDUYDM	CDUYM	MCDU 33
13	52	Positive	CDUZDP	CDUZP	PCDU 34
	52	Negative	CDUZDM	CDUZM	MCDU 34
12	53	Positive	TRNDP	TRNP	PCDU 35
	53	Negative	TRNDM	TRNM	MCDU 35
11	54	Positive	SHFTDP	SHAFTP	PCDU 36
	54	Negative	SHFTDM	SHAFTM	MCDU 36

JOB OPERATING PROCEDURE FOR (FVP)
PROGRAM IN-OUT CHECKS

JDC 05781 **REV.** — **PAGE** 1 **OF** 10
INITIAL TDRR 32809 **D.S. PGS** 1

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

The IN-OUT Program contains eight individual test routines, identified as STARTP, STPIP, and TEST 1 through TEST 6. The tests are performed sequentially starting with TEST 6, followed by TEST 1 through 5. STARTP. STPIP. A description of each test is provided under the Program Analysis section included at the end of this JDC The sequence of testing is also shown in the Flowchart of Figure 1.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES JDC's 05406, 05407, 05412
05413, 05414
ND's 1021042, 1021043

IMPORTANT Do not attempt to perform this test until step 1 of this JDC has been verified

INTERVAL As required

TOOLS AND MATERIAL Program IN-OUT CHECKS Mylar Tape, JDC 05782

PREPARATION

1. Connect test cable W263 to connectors J4, J5, J7, and J8 of the AGC-OC. Cable W263 is supplied as part of the SUBSYSTEM TEST INTERCONNECTION SET under the Part Number 2016314-011.

2. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

3. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel.

4. Load Program IN-OUT CHECKS (JDC 05782) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

5. Rewind Tape.

6. Verify that the Program has been properly loaded into memory by performing JDC 05407 (Tape Verify Operating Procedure).

7. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

8. Press the CH33-10 indicator switch on the RDC INTERFACE Panel to the on (illuminated) position.

OPERATION

9. Transfer Control to Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

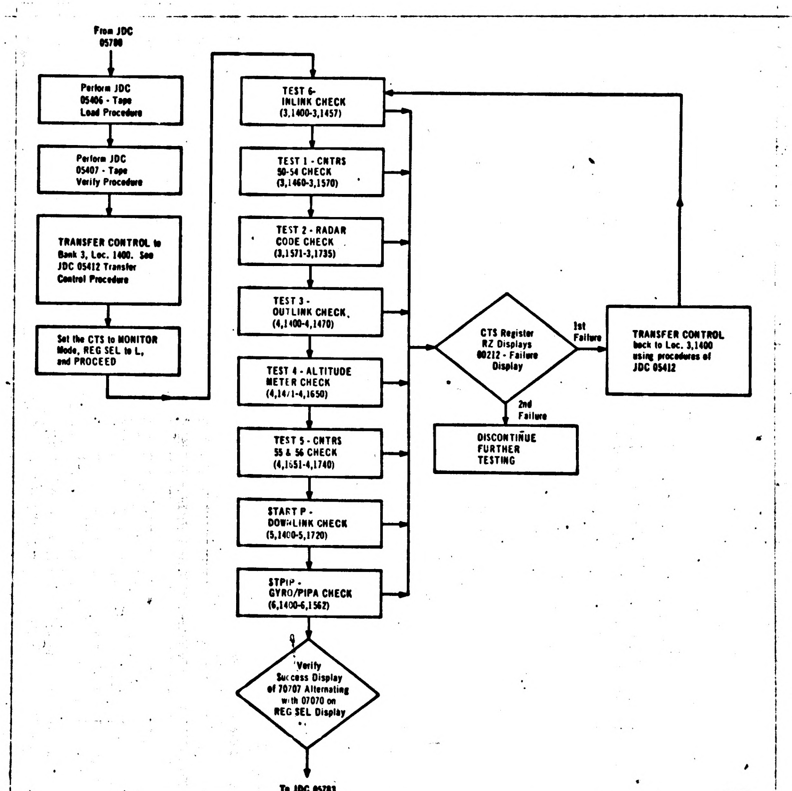
From JDC 05780
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 - Tape Verify Procedure
TRANSFER CONTROL to Bank 3, Loc. 1400. See JDC 05412 Transfer Control Procedure
Set the CTS to MONITOR Mode, REG SEL to L, and PROCEED
TEST 6 - INLINK CHECK (3,1400-3,1457)
TEST 1 - CNTRS 50-54 CHECK (3,1460-3,1570)
TEST 2 - RADAR CODE CHECK (3,1571-3,1735)
TEST 3 - OUTLINK CHECK, (4,1400-4,1470)
TEST 4 - ALTITUDE METER CHECK (4,1471-4,1650)
TEST 5 - CNTRS 55 & 56 CHECK (4,1651-4,1740)
START P - DOWNLINK CHECK (5,1400-5,1720)
STPIP - GYRO/PIPA CHECK (6,1400-6,1562)
Verify Success Display of 70707 Alternating with 07070 on REG SEL Display
To JDC 05783
CTS Register RZ Displays 00212 - Failure Display
1st Failure
TRANSFER CONTROL back to Loc. 3,1400 using procedures of JDC 05412
2nd Failure
DISCONTINUE FURTHER TESTING

Figure 1. Flowchart for Performing Program IN-OUT CHECKS

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10. Press the MONITOR indicator switch to the on (illuminated) position.

11. Press the CL Key.

12. Set the register select switch to position L.

13. Set the INHIBIT INCREMENTS switch to the OFF position.

14. Set the T12 COUNTER STOP switch to the OFF position.

15. Press the PROCEED button.

16. No further operator control is required to complete the eight checks. Checks are performed sequentially under program control. The program will be automatically terminated in either a success display or a stop display. If the test is successful Register L on the Programmer and Monitor Panel will display 70707 alternating with 07070. If the test fails to complete anyone of the eight Checks, Register Z will display the address 0212, and Register A will display the return address (to the main program).

If the test terminates in a failure, Transfer Control (using the procedures of JDC 05412) back to Location 3, 1400, and PROCEED. If the test fails again discontinue further testing, and note the contents of Register A (return address). Compare this address with the address groups of each of the eight test sequences. The "failed" address should fall within one of these groupings. The specific test functions unable to be performed are determined by referencing the Program Analysis section for a description of the "failed" test.

PROGRAM ANALYSIS

TEST 6 (Locations 3, 1400-3, 1457)

This test checks the decoding circuitry controlled by bits 5 and 6 of channel 13. Bits 5 and 6 are decoded to control information gated into the UPLINK counter (by way of the counter priority cells) from either of two sources, interface signals UPLINK or CROSSLINK. It also checks that the circuit used for detecting excessive rates of information flow from these two sources is operative. Excessive data rate is indicated by the INLINK TOO FAST bit of channel 33 when an excessive rate is detected. The INLINK TOO FAST function is tested by using bit 6 of channel 14 to generate signal GYENAB and making the interface connection such that GYENAB causes XLINK0. The frequency of GYENAB is approximately 102 KC. The test bit configurations are listed as follows·

Set Ch. 13 Bits 6 5	Set Ch. 14 Bit 6	In Ch. 33 Bit 11
		Look for a
0 0	1	1
1 0	1	1
1 1	1	1
0 1	1	0

The bits of channel 33 are inverted. Therefore bit 11 will be a one until the INLINK TOO FAST signal is present. In checks one through three Bit 5 of Channel 13 and Bit 10 of Channel 33 inhibit information from entering the counter priority cells via XLINK, therefore the excessive rate of XLINK0 is not detected. In check number four the states of Bits 5 and 6 of Channel 13 and Bit 10 of Channel 33 allows information to be gated into the INLINK circuitry via XLINK and at this time the excessive rate of XLINK0 is detected generating INLINK TOO FAST and setting Channel 33 Bit 11 to zero.

TEST 1 (Locations 3, 1460-3, 1570)

This test checks that OUT COUNTERS 50 through 54 are diminished by instruction DINC when the proper bit is written into Channel 14. This is accomplished by the wiring of test cable W263 which connects the interface signals generated by instruction DINC into circuits which request counter increments. See Table 1.

Numbers are placed in Counters 50-54 in 1's complement. Results appear in Counters 32-36 in 2's complement form. The CDU-DP or M signals are generated until the contents of the OUT COUNTER are diminished to minus zero. At this time the channel bit which was requesting the DINC instruction is reset and checked.

In this routine each counter pair, 32 + x, 50 + x (x = 0 to X = 4) is tested separately. Four tests are performed on each pair with the expected results shown below. (Initially 32 + x is set to -30_{10}).

The following numbers are placed in 50 + x.	The corresponding 32 + x values should become
$+30_{10}$	+0
$+30_{10}$	$+30_{10}$
-30_{10} (1's complement)	+0
-30_{10})1's complement)	-30 (2's complement)

When performing a trial, after one of the above numbers is placed on 50+x and its corresponding drive bit set, the program waits until the drive bit resets and then checks 32+x for the expected result. In order to avoid an endless loop in the case of the drive bit not resetting, a time limiting loop has been incorporated. If the drive bit does not reset within the given time (approximately 10 msec) the test fails.

Table 1

Load Ch. 14 Bit	DINC OUTCTR	If Contents of OUTCTR is	Generate Interface Signal	This is Wired Into	Causes Counter Request
16/15	50	Positive	CDUXDP	CDUXP	PCDU 32
	50	Negative	CDUXDM	CDUXM	MCDU 32
14	51	Positive	CDUYDP	CDUYP	PCDU 33
	51	Negative	CDUYDM	CDUYM	MCDU 33
13	52	Positive	CDUZDP	CDUZP	PCDU 34
	52	Negative	CDUZDM	CDUZM	MCDU 34
12	53	Positive	TRNDP	TRNP	PCDU 35
	53	Negative	TRNDM	TRNM	MCDU 35
11	54	Positive	SHFTDP	SHAFTP	PCDU 36
	54	Negative	SHFTDM	SHAFTM	MCDU 36

TEST 2 (Locations 3, 1571–4, 1400)

This test checks the operation of the radar control codes associated with Bits 1 through 4 of Channel 13. This is accomplished by using the decoded radar signals to generate increment requests for BMAG counters 42, 43 and 44. Bit 8 of Channel 13 is tested also since the counter requests which are generated at the interface module must pass through circuitry which is enabled by this bit position.

Events listed in Table 2 occur when a code is entered into the lower 4 Bits of Channel 13.

The radar signals are generated at a 3200 cycle/second rate for a period of 90 ms. This results in the generation of 256 pulses each time a code is entered into Channel 13. Initially, in this test, counters 42–44 are set to +0 and three tests are performed with each radar code and Bit 8 of Channel 13 set. In the case of codes 11, 14 and 16 the proper counter is initialized at -400. The first request should PINC the counter to -0. The second request with the same code should PINC the counter to +400. The counter is then re-initialized to 37777. After the next request, with the same code, it should read +377.

In the case of codes 12, 15 and 17, the proper counter is initialized at +400. The first request should MINC the counter to -0. The second request of the same code should MINC it to -377. It is then set to 40400. After the next request of the same code it should read 40000.

A test is performed with each radar code and Bit 8 of Channel 13 reset to ascertain that the counter accessed will not change in value. The program periodically checks that no counter has changed from +0 other than the one to which a request is sent. When Bit 4 in Channel 13 is reset, the program knows that the proper counter should contain the expected value. A timing loop has been incorporated to prevent an endless loop from occurring in the event Bit 4 of Channel 13 was not reset. The no signal codes (10 and 13) are used to check that no signals are generated to any counter.

Table 2

Ch. 13 Code 4 3 2 1	Radar Signal Generated	Counter Request Generated	Type of Increment Requested	On CTR#
1 0 0 0	None	None	None	None
1 0 0 1	RR RANG	BMGXP	PINC	42
1 0 1 0	RR RARA	BMGXM	MINC	42
1 0 1 1	None	None	None	None
1 1 0 0	LRSVEL	BMGYP	PINC	43
1 1 0 1	LRYVEL	BMGYM	MINC	43
1 1 1 0	LRZVEL	BMGZP	PINC	44
1 1 1 1	LR RANG	BMGZM	MINC	44

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TEST 3 (Locations 4, 1400–4, 1470)

This test checks that Bit 1 of Channel 14 controls the OUTLINK circuitry and that this circuitry is operating properly. Bit 1 of Channel 14 generates a flag bit for the OUTLINK data which causes the computer to serially shift the 15 bits of OUTLINK data out of Counter 57. Each of the 16 bits will generate either an OTLNK1 or OTLNK0 signal in the Interface Module depending on whether data bit was a "1" or a "0" respectively. These signals are then used to generate SHINC and SHANC instructions for the UPLINK counter.

OTLNK1 causes UPLINK1 which requests a SHANC on Counter 45.

OTLINK0 causes UPLINK0 which requests a SHINC on Counter 45.

This causes the data of Counter 57 to be duplicated in Counter 45.

Bits 5 and 6 of Channel 13 are also incorporated in this test since they control the inhibit or enable status of the UPLINK counter.

Four checks are performed here. They are -

1. a. Set Channel 13 Bits 5 and 6 to 00.
   b. Set Counter 57 to 25252 Counter 45= 0, and Channel 14 Bit 1=1.
   c. Wait a maximum of 10 ms for Channel 14 Bit 1 to reset. If it has not reset within this time, test fails.
   d. Delay 5 more ms.
   e. Check that Counter 45 now contains 25252. If not, Fail.
2. a. Set Channel 13 Bits 6 and 5 to 10 (INHIBIT UPLINK).
   b. Set Counter 57 to 25252, Counter 45= 0 and Channel 14 Bit 1=1.
   c. Wait a maximum of 10 ms for Channel 14 Bit 1 to reset. If it has not reset within this time, test fails.
   d. Delay 5 more ms.
   e. Check that Counter 45 still contains 0. If not, Fail.
3. Same as 1 above except set CTR 57 to 52525 in step b. and expect 52525 in CTR 45 in step e.
4. Same as 2 above except set CTR 57 to 52525 in step b.

TEST 4 (Locations 4, 1471–4, 1650)

This test checks that Bits 2 and 3 of Channel 14 control the altitude meter circuitry and that this circuitry is operating properly. Bit 3 of Channel 14 generates a flag bit for the ALTITUDE METER data which causes the computer to serially shift the 15 data bits of ALTITUDE METER data out of Counter 60. Bit 2 selects the data transmission paths.

Bit 2	Data Bit	Transmit Via
0	0	ALTO
	1	ALT1
	0	ALRTO
1	1	ALRT1

The test wiring at the interface is such that -

ALTO causes RRINO,
ALT1 causes RRIN1,

ALRTO causes LRINO,
ALRT1 causes LRIN1,

The RR and LR signals will be converted to counter requests for SHINC and SHANC operations on Counter 46 when a radar code is loaded into Channel 13.

The test functions performed are listed in Table 3 below.

There are two checks made for each code listed for Channel 13. In the first check Counter 60 is loaded with an odd bit configuration, in the second check Counter 60 is loaded with an even bit configuration. The two results are then added and the answer checked for minus zero. Where no data is expected the answer is checked for positive zero.

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Table 3

Load Ch. 14 Bits	Load Ch. 13 Bits	Data Expected in Counter 46
3 2	4 3 2 1	
1 0	1 0 0 0	None
	1 0 0 1	Duplicate of Counter 60
	1 0 1 0	Duplicate of Counter 60
1 1	1 0 0 0	None
	1 1 0 0	Duplicate of Counter 60
	1 1 0 1	Duplicate of Counter 60
	1 1 1 0	Duplicate of Counter 60
	1 1 1 1	Duplicate of Counter 60

The second check tests for the generation of the flag bit from the ALTITUDE METER circuitry. This check consists of loading Counter 60 with a plus one and waiting until this bit has been shifted one place to the left. At this time Counter 46 is checked to see that it contains the same information.

TEST 5 (Locations 4, 1651–4, 1740)

This test checks that out Counter 55 and 56 are diminished by instruction DINC when the proper bit is written into Channel 14. This is accomplished by test wiring the interface signals generated during instruction DINC into circuits which request counter increments. The counter requests generated are listed in Table 4 below.

Bit 8 of Channel 13 is also used since it enables the counter requests to be gated into the counter cells.

Following is a list of tests actually performed.

a. 1. Write 1 into Channel 13 Bit 8.
   2. Zero CTR 42 (BMAGX), Zero CTR 43 (BMAGY).
   3. Deposit 00377 into CTR 55.
   4. Set Channel 14 Bits 5, 4 = 01.
   5. Wait until Channel 14 bit resets (100 ms is allowed).
   6. Does CTR 42 = 00377? If not, error.

b. Same as a. except 77400 CTR 55 (step 2) and 77400 will be expected on CTR 42 (step 6).

c. 1. Write 1 into Channel 13 Bit 8.
   2. Zero CTR 42, Zero CTR 43.
   3. Deposit 00377 into CTR 56.
   4. Set Channel 14 Bits 5, 4 = 10.
   5. Wait until Channel 14 bit resets (100 ms is allowed).
   6. Does CTR 43 = 00377? If not, error.

d. Same as c. except 77400 is deposited in CTR 56 (step 2) and 774008 will be expected on CTR 43 (step 6).

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Table 4

Load Ch. 14 Bit	DINC OUTCTR	If Contents of OUTCTR is	Generate Interface Signal	This is Wired Into	Causes CTR Request
4	55	Positive	+THRST	BMGXP	PINC 42
	55	Negative	-THRST	BMGXM	MINC 42
5	56	Positive	+EMS	BMGYP	PINC 43
	56	Negative	-EMS	BMGYM	MINC 43

TEST STARTP (Locations 5, 1400–5, 1720)

This test is designed to check the decoding circuitry of Downlink Channels 34 and 35. The Downlink circuitry consists of Channels 34 and 35 (which contain the information to be transmitted), a 5-stage counter (whose outputs are decoded to gate out one bit of information at a time), and signals DKBSNC, and DKSTRT. DKBSNC enables the output channels and causes the 5-stage counter to be "incremented." The other signal, DKSTRT, resets the 5-stage counter. Bit 7 of Channel 13, the "flag bit" for the Downlink data, is gated out by signal DKBSNC when the 5-stage counter is in the zero state. The outputs from the 5-stage counter are decoded and function as follows; stages 4 and 5 divide Channels 34 and 35 into four 8 bit sections, stage 1, 2 and 3 are decoded to enable a single bit from an 8 bit section to be transmitted. Bit 16 is the first bit transmitted from a channel while the parity bit is the last bit transmitted. Channel 34 is transmitted before Channel 35.

Following is a list of interface connections used to generate the required Downlink signals.

GYRRST causes DKSTRT which resets the 5-stage counter
GYRSET causes DKBSNC which steps the counter
DKDATA causes XLINK1 which allows the Downlink output bits to be stored in Counter 45 (INLINK).

GYRRST and GYRSET are controlled by Bit 10 of Channel 14 and the contents of out Counter 47 GYROD. The number of times signal GYRSET is generated is determined by the contents of Counter 47. Signal GYRRST is generated whenever GYRSET is not. Both occur at a frequency of 3200 cps.

Following is a list of checks performed within this test. The first Check below proves that only one of the four 8 bit sections is active and that it is the proper one.

C(34)	C(35)	# BITSYNC'S Generated	C(45)
00177	77777	9	00000

The three checks below plus the first test of the next group are sufficient to prove that multiple decoding is not present within the eight bit section.

37600	77777	2	00000
17600	77777	3	00000
07600	77777	4	00000

The eight checks below prove that the lower 3 stages of the 5 stages are decoding properly and that each of eight states is capable of gating a data bit out of Channel 34.

40000	77777	5	00001
37600	77777	3	00001
17600	77777	4	00001

DATE ________

TEST 2 (Locations 3, 1571–4, 1400)

This test checks the operation of the radar control codes associated with Bits 1 through 4 of Channel 13. This is accomplished by using the decoded radar signals to generate increment requests for BMAG counters 42, 43 and 44. Bit 8 of Channel 13 is tested also since the counter requests which are generated at the interface module must pass through circuitry which is enabled by this bit position.

Events listed in Table 2 occur when a code is entered into the lower 4 Bits of Channel 13.

The radar signals are generated at a 3200 cycle/second rate for a period of 90 ms. This results in the generation of 256 pulses each time a code is entered into Channel 13. Initially, in this test, counters 42–44 are set to +0 and three tests are performed with each radar code and Bit 8 of Channel 13 set. In the case of codes 11, 14 and 16 the proper counter is initialized at –400. The first request should PINC the counter to –0. The second request with the same code should PINC the counter to +400. The counter is then re-initialized to 37777. After the next request, with the same code, it should read +377.

In the case of codes 12, 15 and 17, the proper counter is initialized at +400. The first request should MINC the counter to –0. The second request of the same code should MINC it to –377. It is then set to 40400. After the next request of the same code it should read 40000.

A test is performed with each radar code and Bit 8 of Channel 13 reset to ascertain that the counter accessed will not change in value. The program periodically checks that no counter has changed from +0 other than the one to which a request is sent. When Bit 4 in Channel 13 is reset, the program knows that the proper counter should contain the expected value. A timing loop has been incorporated to prevent an endless loop from occurring in the event Bit 4 of Channel 13 was not reset. The no signal codes (10 and 13) are used to check that no signals are generated to any counter.

TEST 3 (Locations 4, 1400–4, 1470)

This test checks that Bit 1 of Channel 14 controls the OUTLINK circuitry and that this circuitry is operating properly. Bit 1 of Channel 14 generates a flag bit for the OUTLINK data which causes the computer to serially shift the 15 bits of OUTLINK data out of Counter 57. Each of the 16 bits will generate either an OTLNK1 or OTLNK0 signal in the Interface Module depending on whether data bit was a "1" or a "0" respectively. These signals are then used to generate SHINC and SHANC instructions for the UPLINK counter.

Table 2

Ch. 13 Code 4 3 2 1	Radar Signal Generated	Counter Request Generated	Type of Increment Requested	On CTP#
1 0 0 0	None	None	None	None
1 0 0 1	RR RANG	BMGXP	PINC	42
1 0 1 0	RR RARA	BMGXM	MINC	42
1 0 1 1	None	None	None	None
1 1 0 0	LRSVEL	BMGYP	PINC	43
1 1 0 1	LRYVEL	BMGYM	MINC	43
1 1 1 0	LRZVEL	BMGZP	PINC	44
1 1 1 1	LR RANG	BMGZM	MINC	44

OTLNK1 causes UPLINK1 which requests a SHANC on Counter 45.

OTLINK0 causes UPLINK0 which requests a SHINC on Counter 45.

This causes the data of Counter 57 to be duplicated in Counter 45.

Bits 5 and 6 of Channel 13 are also incorporated in this test since they control the inhibit or enable status of the UPLINK counter.

Four checks are performed here. They are –

1. a. Set Channel 13 Bits 5 and 6 to 00.
   b. Set Counter 57 to 25252 Counter 45= 0, and Channel 14 Bit 1=1.
   c. Wait a maximum of 10 ms for Channel 14 Bit 1 to reset. If it has not reset within this time, test fails.
   d. Delay 5 more ms.
   e. Check that Counter 45 now contains 25252. If not, Fail.
2. a. Set Channel 13 Bits 6 and 5 to 10 (INHIBIT UPLINK).
   b. Set Counter 57 to 25252, Counter 45= 0 and Channel 14 Bit 1=1.
   c. Wait a maximum of 10 ms for Channel 14 Bit 1 to reset. If it has not reset within this time, test fails.
   d. Delay 5 more ms.
   e. Check that Counter 45 still contains 0. If not, Fail.
3. Same as 1 above except set CTR 57 to 52525 in step b. and expect 52525 in CTR 45 in step e.
4. Same as 2 above except set CTR 57 to 52525 in step b.

TEST 4 (Locations 4, 1471–4, 1650)

This test checks that Bits 2 and 3 of Channel 14 control the altitude meter circuitry and that this circuitry is operating properly. Bit 3 of Channel 14 generates a flag bit for the ALTITUDE METER data which causes the computer to serially shift the 15 data bits of ALTITUDE METER data out of Counter 60. Bit 2 selects the data transmission paths.

Bit 2	Data Bit	Transmit Via
0	0	ALTO
	1	ALT1
	0	ALRTO
1	1	ALRT1

The test wiring at the interface is such that –

ALTO causes RRINO,
ALT1 causes RRIN1,

ALRTO causes LRINO,
ALRT1 causes LRIN1,

The RR and LR signals will be converted to counter requests for SHINC and SHANC operations on Counter 46 when a radar code is loaded into Channel 13.

The test functions performed are listed in Table 3 below.

There are two checks made for each code listed for Channel 13. In the first check Counter 60 is loaded with an odd bit configuration, in the second check Counter 60 is loaded with an even bit configuration. The two results are then added and the answer checked for minus zero. Where no data is expected the answer is checked for positive zero.

Table 3

Load Ch. 14 Bits	Load Ch. 13 Bits	Data Expected in Counter 46
3 2	4 3 2 1	
1 0	1 0 0 0	None
	1 0 0 1	Duplicate of Counter 60
	1 0 1 0	Duplicate of Counter 60
1 1	1 0 0 0	None
	1 1 0 0	Duplicate of Counter 60
	1 1 0 1	Duplicate of Counter 60
	1 1 1 0	Duplicate of Counter 60
	1 1 1 1	Duplicate of Counter 60

The second check tests for the generation of the flag bit from the ALTITUDE METER circuitry. This check consists of loading Counter 60 with a plus one and waiting until this bit has been shifted one place to the left. At this time Counter 46 is checked to see that it contains the same information.

TEST 5 (Locations 4, 1651–4, 1740)

This test checks that out Counter 55 and 56 are diminished by instruction DINC when the proper bit is written into Channel 14. This is accomplished by test wiring the interface signals generated during instruction DINC into circuits which request counter increments. The counter requests generated are listed in Table 4 below.

Bit 8 of Channel 13 is also used since it enables the counter requests to be gated into the counter cells.

Following is a list of tests actually performed.

a. 1. Write 1 into Channel 13 Bit 8.
   2. Zero CTR 42 (BMAGX), Zero CTR 43 (BMAGY).
   3. Deposit 00377 into CTR 55.
   4. Set Channel 14 Bits 5, 4 = 01.
   5. Wait until Channel 14 bit resets (100 ms is allowed).
   6. Does CTR 42 = 00377? If not, error.

b. Same as a. except 77400 CTR 55 (step 2) and 77400 will be expected on CTR 42 (step 6).

c. 1. Write 1 into Channel 13 Bit 8.
   2. Zero CTR 42, Zero CTR 43.
   3. Deposit 00377 into CTR 56.
   4. Set Channel 14 Bits 5, 4 = 10.
   5. Wait until Channel 14 bit resets (100 ms is allowed).
   6. Does CTR 43 = 00377? If not, error.

d. Same as c. except 77400 is deposited in CTR 56 (step 2) and 774008 will be expected on CTR 43 (step 6).

TEST STARTP (Locations 5, 1400–5, 1720)

This test is designed to check the decoding circuitry of Downlink Channels 34 and 35. The Downlink circuitry consists of Channels 34 and 35 (which contain the information to be transmitted), a 5-stage counter (whose outputs are decoded to gate out one bit of information at a time), and signals DKBSNC, and DKSTRT. DKBSNC enables the output channels and causes the 5-stage counter to be "incremented." The other signal, DKSTRT, resets the 5-stage counter. Bit 7 of Channel 13, the "flag bit" for the Downlink data, is gated out by signal DKBSNC when the 5-stage counter is in the zero state. The outputs from the 5-stage counter are decoded and function as follows; stages 4 and 5 divide Channels 34 and 35 into four 8 bit sections, stage 1, 2 and 3 are decoded to enable a single bit from an 8 bit section to be transmitted. Bit 16 is the first bit transmitted from a channel while the parity bit is the last bit transmitted. Channel 34 is transmitted before Channel 35.

Table 4

Load Ch. 14 Bit	DINC OUTCTR	If Contents of OUTCTR is	Generate Interface Signal	This is Wired Into	Causes CTR Request
4	55	Positive	+THRST	BMGXP	PINC 42
	55	Negative	-THRST	BMGXM	MINC 42
5	56	Positive	+EMS	BMGYP	PINC 43
	56	Negative	-EMS	BMGYM	MINC 43

Following is a list of interface connections used to generate the required Downlink signals.

GYRRST causes DKSTRT	which resets the 5-stage counter
GYRSET causes DKBSNC	which steps the counter
DKDATA causes XLINK1	which allows the Downlink output bits to be stored in Counter 45 (INLINK).

GYRRST and GYRSET are controlled by Bit 10 of Channel 14 and the contents of out Counter 47 GYROD. The number of times signal GYRSET is generated is determined by the contents of Counter 47. Signal GYRRST is generated whenever GYRSET is not. Both occur at a frequency of 3200 cps.

Following is a list of checks performed within this test. The first Check below proves that only one of the four 8 bit sections is active and that it is the proper one.

C(34)	C(35)	# BITSYNC'S Generated	C(45)
00177	77777	9	00000

The three checks below plus the first test of the next group are sufficient to prove that multiple decoding is not present within the eight bit section.

37600	77777	2	00000
17600	77777	3	00000
07600	77777	4	00000

The eight checks below prove that the lower 3 stages of the 5 stages are decoding properly and that each of eight states is capable of gating a data bit out of Channel 34.

40000	77777	5	00001
37600	77777	3	00001
17600	77777	4	00001

C(34)	C(35)	# BITSYNC'S Generated	C(45)
07600	77777	5	00001
03600	77777	6	00001
01600	77777	7	00001
00600	77777	8	00001
00200	77777	9	00001

The three checks below prove that the remaining three states of stages 4 and 5 are getting decoded properly and activate the proper 8 bit section.

*10000	77777	17	00000
10100	*10177	25	00000
10100	*10000	33	00000

The three checks below show that each of the bits within an 8 bit section is capable of being transmitted.

*40177	10000	17	00000
*40000	77600	25	00377
40000	*40177	33	00377

*The input Counter 45 is inhibited until the position being interrogated is beyond this point.

The last check performed in this section sets Channel 34 and 35 to zero, sets Bit 7 of Channel 13 to a one and generates two BITSYNC pulses. Counter 45 is checked for 1 pulse, if this test is successful Bit 7 of Channel 13 is functioning properly.

TEST STPIP (Locations 6,1400-6,1562)

This test checks the GYRO signals controlled by Channel 14, Bits 7 through 10, and the associated circuitry of PIPA Counters 37, 40 and 41.

The interface connections are listed in Table 5 below.

Ordinarily this signal pairing would not function properly, since the GYRO signals (occuring at a 102.4 KC rate) are gated by computer timing signal SB1, whereas the PIPA counter increments are generated during SBZ time. The problem was solved by inverting the counter increment requests generated by the GYRO signals. Physically this was accomplished by wiring the high side of GYRO output transformer to the low side of the PIPA input transformer. Computer signal PIPSAM then converted the 102.4 KC GYRO signals to 3200 KC counter increment requests for the three PIPA counters.

The PIPA counter increment requests are controlled by a circuit which rejects the first three consecutive pulses of one type, i.e., the first three PINC requests or three MINC requests. In order to check that all of the above circuitry is functioning properly the following tests are made for each code which is entered into Channel 14.

a. Enter a code into Channel 14 which will pre-condition the PIPA circuits so that the first three counter increment requests generated by the test code will be rejected.

b. Enter the code to be tested into Channel 14.

c. When Bit 10 of Channel 14 gets reset, go check the counter which was to be incremented for the proper number of pulses.

d. Then check that the other two counters contain positive zero, that is, they did not receive any pulses.

e. The number of pulses gated out for each test is octal 103. The counter being tested is checked for octal 100.

f. In the case of the two illegal codes, all three counters are checked for positive zero.

The term pre-condition implies that if the code to be tested will cause PINCS on a counter, the code which MINCS the same counter will be used to set the PIPA rejection circuit to

DATE ______

a known state. Therefore the first three positive increment requests will be rejected. The reverse is also true when the MINC codes for each counter are tested.

Table 5

Load Ch. 14 10 9 8 7	Generate Signal	Causes Counter Request
1 0 0 0	None	None
1 0 0 1	GYXP	PINC 37
1 0 1 0	GYYP	PINC 40
1 0 1 1	GYZP	PINC 41
1 1 0 0	None	None
1 1 0 1	GYXM	MINC 37
1 1 1 0	GYYM	MINC 40
1 1 1 1	GYZM	MINC 41

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF ___

JDC
NO. 05781
REV. —
INITIAL TDRR 32801

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM IN-OUT CHECKS

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION
APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
16	REG SEL displays success indication 70707 alternating with 07070	1111 000 111 000 111 alt. w/ 0000 111 000 111 000	

DATE ______

C(34)	C(35)	# BITSYNC'S Generated	C(45)
07600	77777	5	00001
03600	77777	6	00001
01600	77777	7	00001
00600	77777	8	00001
00200	77777	9	00001

The three checks below prove that the remaining three states of stages 4 and 5 are getting decoded properly and activate the proper 8 bit section.

*10000	77777	17	00000
10100	*10177	25	00000
10100	*10000	33	00000

The three checks below show that each of the bits within an 8 bit section is capable of being transmitted.

*40177	10000	17	00000
*40000	77600	25	00377
40000	*40177	33	00377

*The input Counter 45 is inhibited until the position being interrogated is beyond this point.

The last check performed in this section sets Channel 34 and 35 to zero, sets Bit 7 of Channel 13 to a one and generates two BITSYNC pulses. Counter 45 is checked for 1 pulse, if this test is successful Bit 7 of Channel 13 is functioning properly.

TEST STPIP (Locations 6, 1400–6, 1562)

This test checks the GYRO signals controlled by Channel 14, Bits 7 through 10, and the associated circuitry of PIPA Counters 37, 40 and 41.

The interface connections are listed in Table 5 below.

Ordinarily this signal pairing would not function properly, since the GYRO signals (occuring at a 102.4 KC rate) are gated by computer timing signal SB1, whereas the PIPA counter increments are generated during SBZ time. The problem was solved by inverting the counter increment requests generated by the GYRO signals. Physically this was accomplished by wiring the high side of GYRO output transformer to the low side of the PIPA input transformer. Computer signal PIPSAM then converted the 102.4 KC GYRO signals to 3200 KC counter increment requests for the three PIPA counters.

The PIPA counter increment requests are controlled by a circuit which rejects the first three consecutive pulses of one type, i.e., the first three PINC requests or three MINC requests. In order to check that all of the above circuitry is functioning properly the following tests are made for each code which is entered into Channel 14.

a. Enter a code into Channel 14 which will pre-condition the PIPA circuits so that the first three counter increment requests generated by the test code will be rejected.

b. Enter the code to be tested into Channel 14.

c. When Bit 10 of Channel 14 gets reset, go check the counter which was to be incremented for the proper number of pulses.

d. Then check that the other two counters contain positive zero, that is, they did not receive any pulses.

e. The number of pulses gated out for each test is octal 103. The counter being tested is checked for octal 100.

f. In the case of the two illegal codes, all three counters are checked for positive zero.

The term pre-condition implies that if the code to be tested will cause PINCS on a counter, the code which MINCS the same counter will be used to set the PIPA rejection circuit to

DATE ________

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a known state. Therefore the first three positive increment requests will be rejected. The reverse is also true when the MINC codes for each counter are tested.

Table 5

Load Ch. 14 10 9 8 7	Generate Signal	Causes Counter Request
1 0 0 0	None	None
1 0 0 1	GYXP	PINC 37
1 0 1 0	GYYP	PINC 40
1 0 1 1	GYZP	PINC 41
1 1 0 0	None	None
1 1 0 1	GYXM	MINC 37
1 1 1 0	GYYM	MINC 40
1 1 1 1	GYZM	MINC 41

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF ___

JDC
NO. 05781
REV. —
INITIAL TDRR 32807

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM IN-OUT CHECKS

ASSEMBLY UNDER TEST
TITLE ________
SER. NO. ______ DWG ______ REV. ____

TEST HISTORY
DATE ______ ______ SITE / LOCATION
START END
TIME ______ ______ TOTAL ELAPSED
START END

MAJOR GROUND SUPPORT EQUIPMENT
NAME ________ SER. NO. ______ CAL DATE
NAME ________ SER. NO. ______ CAL DATE

CONDUCTED BY ________ APPROVED BY ________
NAME/AFFILIATION NAME/AFFILIATION

Step	Parameter	Specification	Results
16	REG SEL displays success indication 70707 alternating with 07070	1111 000 111 000 111 alt. w/ 0000 111 000 111 000	________

DATE ________

JDC 05782 REV. — PAGE 1 OF 1

JOB IN-OUT CHECKS MYLAR TAPE

INITIAL TDRR 32809 D.S. PGS ___

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the IN-OUT CHECKS Program, JDC 05780.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA

REFERENCES

JDC 05781

ND's 1021042, 1021043

IMPORTANT

INTERVAL

As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JDC 05782 REV. — PAGE 1 OF 1

JOB IN-OUT CHECKS MYLAR TAPE

INITIAL TDRR 32809 D.S. PGS ___

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the IN-OUT CHECKS Program, JDC 05780.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

JDC 05781

ND's 1021042, 1021043

IMPORTANT

INTERVAL

As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE ___

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

JDC 05783 **REV.** A **PAGE** 1 **OF** 17
INITIAL TDRR 32809 **D.S. PGS** 1

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

Program ALLEREST contains three separate tests, the first of which tests the operation of Channels 30, 31, and 32. The next test checks the operation of the DSKY relays used to transmit signals to the spacecraft. The last test checks the operation of the DSKY Indicators and Display Registers. It is recommended that the Program Analysis sections of this JDC be reviewed prior to testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-7-67	34517	4, 10, 12-17	All	EA	-

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program ALLEREST Mylar Tape, JDC 05784

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the RDC Interface panel of the CTS.

3. Load PROGRAM ALLEREST (JDC 05784) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407, Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

PROGRAM ANALYSIS - CHANNELS 30, 31, AND 32

The programmed functions of this portion of the test checks that Channels 30, 31, and 32 receive DC signals in the proper bit positions via the Interface Module. Initially, the Program verifies that all the Bit Positions of Channels 30, 31, and 32 are de-energized. When this check is successfully completed,

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JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

JDC 05783 **REV** A **PAGE** 2 **OF** 17

SUBSYSTEM Computer
ASSY Block II - C Computer

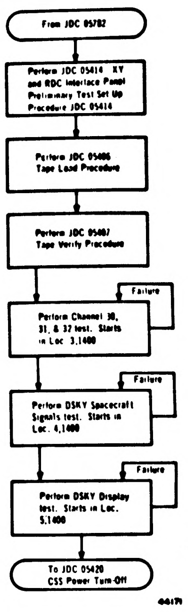
From JDC 05782
Perform JDC 05414 XY and RDC Interface Panel Preliminary Test Set Up Procedure JDC 05414
Perform JDC 05406 Tape Load Procedure
Perform JDC 05407 Tape Verify Procedure
Failure
Perform Channel 30, 31, & 32 test. Starts in Loc 3,1400
Failure
Perform DSKY Spacecraft Signals test. Starts in Loc. 4,1400
Failure
Perform DSKY Display test. Starts in Loc. 5,1400
To JDC 05420 CSS Power Turn-Off
44171

Figure 1. Flowchart for Performing Program ALLEREST

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

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SUBSYSTEM Computer
ASSY Block II - C Computer

the Program will turn off the DSKY COMP ACTY indicator. Extinguishing COMP ACTY is a signal to the operator to start the switching sequence at the RDC Panel, beginning with CH30-1.

At this point and throughout the remainder of the switching sequence the Program looks for a switch to be energized. When the Program detects an actuation it enters a routine to determine that it was the proper switch, and checks the other two Channels to make sure that they do not have bits present. If no discrepancies are noted during these checks, the Computer will turn on the DSKY COMP ACTY indicator, and Register A will present a five second flashing display. (All bits will flash except the one under test.) At the end of this period the Program will turn off the DSKY COMP ACTY indicator signaling the operator to de-energize the switch just tested and energize the next switch to the left (in this case CH30-2). During the test the number of the Channel under test will appear in the DSKY VERB display.

When one Channel has been completely tested, the test is continued by actuating switch number one of the next Channel. The last switch energized in the sequence is CH32-10. After this Bit is tested the Program will switch to the success routine which will be displayed on Register L as 70707 alternating with 07070.

The DSKY indications used in this test and their interpretation are listed below.

NO ATT	Operator failed to energize the next test bit within one minute of completion of testing of last bit.
KEY RELEASE	Two adjacent switches are energized together for 30 seconds. This situation occurs when the operator energizes the switch to be tested before he de-energized the previous switch which was just checked.
HOLD	Hardware Failure. Detection of an improper bit in CH30, 31, or 32 will be displayed on the DSKY as follows:

Noun - Channel where error was detected

Register 1 - Octal display of CH30

Register 2 - Octal display of CH31

Register 3 - Octal display of CH32

If any error condition occurs the operator Transfers Control back to location 3, 1400 and reruns the test again. If the error resulted from improper operation of the Hardware under test, and a second error occurs, discontinue further testing.

7. Transfer Control to Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

8. Press the MONITOR indicator switch to the on (illuminated) position.

9. Press the CL Key.

10. Set the T12 COUNTER STOP switch to the OFF position.

11. Set the INHIBIT INCREMENTS switch to the OFF position.

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

JDC 05783 **REV** A **PAGE** 4 **OF** 17

SUBSYSTEM Computer
ASSY Block II - C Computer

12. Press the PROCEED button.

13. Verify that the DSKY COMP ACTY indicator switches off.

    NOTE: CH30, 31, and 32 are alternate-action indicator switches which are illuminated in the energized position. To turn on any switch press to the illuminated position. To turn off any switch press to the extinguished position.

14. If an error condition occurs in any part of this test, perform steps 137 and 138.

15. Press CH30-1/IN0-1 to the on (illuminated) position.

16. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

17. Press CH30-1/IN0-1 to the off position.

18. Press CH30-2/IN0-2 to the on position.

19. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

20. Press CH30-2/IN0-2 to the off position.

21. Press CH30-3/IN0-3 to the on position.

22. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

23. Press CH30-3/IN0-3 to the off position.

24. Press CH30-4/IN0-4 to the on position.

25. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

26. Press CH30-4/IN0-4 to the off position.

27. Press CH30-5/IN0-5 to the on position.

28. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and turns off.

29. Press CH30-5/IN0-5 to the off position.

30. Press CH30-6/IN0-6 to the on position.

31. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

32. Press CH30-6/IN0-6 to the off position.

33. Press CH30-7/IN0-7 to the on position.

34. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

35. Press CH30-7/IN0-7 to the off position.

36. Press CH30-8/IN0-8 to the on position.

37. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

38. Press CH30-8/IN0-8 to the off position.

39. Press CH30-9/IN0-9 to the on position.

40. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

41. Press CH30-9/IN0-9 to the off position.

42. Press CH30-10/IN0-10 to the on position.

43. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

44. Press CH30-10/IN0-10 to the off position.

45. Press CH30-11/IN0-11 to the on position.

46. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

47. Press CH30-11/IN0-11 to the off position.

48. Press CH30-12/IN0-12 to the on position.

49. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

50. Press CH30-12/IN0-12 to the off position.

51. Press CH30-13/IN0-13 to the on position.

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52. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

53. Press CH30-13/IN0-13 to the off position.

54. Press CH30-14/IN0-14 to the on position.

55. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

56. Press CH30-14/IN0-14 to the off position.

57. Press CH30-15/IN0-15 to the on position.

58. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

59. Press CH30-15/IN0-15 to the off position.

60. Press CH31-1/IN2-1 to the on position.

61. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

62. Press CH31-1/IN2-1 to the off position.

63. Press CH31-2/IN2-2 to the on position.

64. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

65. Press CH31-2/IN2-2 to the off position.

66. Press CH31-3/IN2-3 to the on position.

67. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

68. Press CH31-3/IN2-3 to the off position.

69. Press CH31-4/IN2-4 to the on position.

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70. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

71. Press CH31-4/IN2-4 to the off position.

72. Press CH31-5/IN2-5 to the on position.

73. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

74. Press CH31-5/IN2-5 to the off position.

75. Press CH31-6/IN2-6 to the on position.

76. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

77. Press CH31-6/IN2-6 to the off position.

78. Press CH31-7/IN2-7 to the on position.

79. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

80. Press CH31-7/IN2-7 to the off position.

81. Press CH31-8/IN2-8 to the on position.

82. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

83. Press CH31-8/IN2-8 to the off position.

84. Press CH31-9/IN2-9 to the on position.

85. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

86. Press CH31-9/IN2-9 to the off position.

87. Press CH31-10/IN2-10 to the on position.

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88. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

89. Press CH31-10/IN2-10 to the off position.

90. Press CH31-11/IN2-11 to the on position.

91. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

92. Press CH31-11/IN2-11 to the off position.

93. Press CH31-12/IN2-12 to the on position.

94. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

95. Press CH31-12/IN2-12 to the off position.

96. Press CH31-13/IN2-13 to the on position.

97. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

98. Press CH31-13/IN2-13 to the off position.

99. Press CH31-14/IN2-14 to the on position.

100. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

101. Press CH31-14/IN2-14 to the off position.

102. Press CH31-15/IN2-15 to the on position.

103. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

104. Press CH31-15/IN2-15 to the off position.

105. Press CH32-1/IN3-1 to the on position.

106. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

107. Press CH32-1/IN3-1 to the off position.

108. Press CH32-2/IN3-2 to the on position.

109. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

110. Press CH32-2/IN3-2 to the off position.

111. Press CH32-3/IN3-3 to the on position.

112. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

113. Press CH32-3/IN3-3 to the off position.

114. Press CH32-4/IN3-4 to the on position.

115. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

116. Press CH32-4/IN3-4 to the off position.

117. Press CH32-5/IN3-5 to the on position.

118. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

119. Press CH32-5/IN3-5 to the off position.

120 Press CH32-6/IN3-6 to the on position.

121. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

122. Press CH32-6/IN3-6 to the off position.

123. Press CH32-7/IN3-7 to the on position.

124. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

125. Press CH32-7/IN3-7 to the off position.

126. Press CH32-8/IN3-8 to the on position.

127. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

128. Press CH32-8/IN3-8 to the off position.

129. Press CH32-9/IN3-9 to the on position.

130. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

131. Press CH32-9/IN3-9 to the off position.

132. Press CH32-10/IN3-10 to the on position.

133. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

134. Press CH32-10/IN3-10 to the off position.

135. Set the register select switch to the L position.

136. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this section of the test has been successfully completed. Stamp data sheet and proceed to step 139 of this JDC.

137. Set the T12 COUNTER STOP switch to the on position.

138. Starting with step 7, perform the procedures of this JDC again. If the failure occurs again discontinue further testing.

PROGRAM ANALYSIS - DSKY SPACECRAFT SIGNALS

This program exercises the DSKY Relays which transmit discrete signals to the spacecraft. This section of the ALLEREST program is composed of 12 test exercises which activate certain DSKY Relays in turn producing a visual indication on the MAIN and NAV DSKY sections of the CTS Interface panel. Tests are performed incrementally with the program pausing at the conclusion of each test to signal the operator with the COMP ACTY light that it is waiting to perform the next test. The operator allows the next test to be performed by pressing Bit 1 of Channel 30 (RDC Interface) twice. Bit 1 of Channel 30 is an alternate action switch which is off initially. On the first actuation Bit 1 is turned on allowing the program to extinguish COMP ACTY. Then the program waits for the next (off) actuation of Bit 1. When Bit 1 is switched off the program will perform the next test. The first set of procedures described under 1 below are concerned with initialization procedures.

1. Program Initialization Routine

a. Turns on DSKY RESTART (Bit 10, Channel 11) light.

b. Switches to ALRMOFF (Location 1465) which in sequence performs the following:

1. Load 60000 into Channel 10, turning off DSKY indicators PROGRAM, TRACKER, GIMBAL LOCK, NO ATT, FREE HOLD, and AUTO.

2. Stores return address (Q) in 0112.

3. Writes PZ (positive zero) into Channels 12, 13, and 33.

4. Reads and Masks Bit 14 of Channel 33 (WARNING light).

5. Tests Bit 14 for the off condition and if true loads PZ into Channel 11 turning off the RESTART light.

6. Switches back to the return address as stored in 0112.

c. Loads PZ into the Index location (TESEL).

d. Switches out to COMPON (location 1515) where it writes 00002 into Channel 11 turning on the COMP ACTY light.

The COMPON and ALRM OFF subroutines are used as integral portions of the test routine described below. The program procedures described under 5 are valid for any test being performed in this section with the only difference being the end result, i.e., the actual indicators illuminated on the DSKY and on the XY Interface panel of the CTS.

2. Program Testing Routine

a. Turn on COMP ACTY. Read Channel 30 and Mask with Bit one and test results with a CCS.

b. If the operator has not pushed the button the program stays in a loop which continues to RDCH30 and test for the anticipated switch actuation.

c. When the switch (Bit 1 CH30) is actuated the program switches to the ALRM OFF subroutine resetting the COMP ACTY light.

d. The program then switches back to the main program and the next instruction is another RDCH30. Channel 30 is read and Masked with bit one and tested with another CCS instruction (at 1414), but this time the test is for a PZ (positive zero) accumulator, indicating that the operator has de-energized Bit of CH30.

e. The CCS instruction above switches the program to an Index (location 1542) instruction. The Index location (TESEL) in combination with the TC (to 1525) to the test table (TSTAB) instruction provides a switch which selects the next test (in sequence) from the table.

f. TSTAB will switch the program into the proper test subroutine which will set up the DSKY Relay word to illuminate the specified indicators.

g. After the indicators have been turned on the program will increment TESEL (Index) so that the next location in the test table will be selected after the operator repeats the on-off switching sequence of Bit 1 Channel 30. The program will loop back to (a) above and repeat (a) through (g) for the next test sequence.

There is no success display provided at the end of this particular section of the ALLEREST. The test will be completed successfully if all of the indicators and alarms specified in the steps below illuminate and extinguish in accordance with the procedure.

139. Set the T12 COUNTER STOP switch to the OFF position.

140. Transfer Control to Bank 4, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

141. Press RDC Interface switch CH30-15/IN0-15 to the on (illuminated) position.

142. Press the MONITOR indicator switch to the on (illuminated) position.

143. Press the CL Key.

144. Set switches INHIBIT INCREMENTS and T12 COUNTER STOP to the OFF position.

145. Press the ALARM RESET button, then the PROCEED button.

146. When the COMP ACT light appears on either DSKY, verify the following:

a. All lights are OFF in the MAIN DSKY section of the XY Interface Panel.

b. All lights are OFF in the NAV DSKY section of the XY Interface Panel.

c. All alarm lights on the DSKY are OFF.

NOTE: RDC Interface switch CH30-1 is an alternate action indicator switch which is illuminated in the on state and extinguished in the off state. When performing any steps which require CH30-1 to be turned on and off, allow an approximate 3 second delay between switch actuations.

147. Press the CH30-1 on and then off.

148. On either DSKY verify that the COMP ACTY light is ON.

149. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M37, M42, N25, and N30.

150. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

151. Press CH30-1 OFF.

152. On either DSKY verify that the COMP ACTY light is on.

153. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M34 and N20.

154. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

155. Press CH30-1 OFF.

156. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M36 and N19.

157. On either DSKY verify that the COMP ACTY light is ON.

158. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

159. Press CH30-1 OFF.

160. On either DSKY verify that the COMP ACTY light is ON.

161. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M41 and N29.

162. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

163. Press CH30-1 OFF.

164. On either DSKY verify that the COMP ACTY and GIMBAL LOCK lights are ON.

165. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

166. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

167. Press CH30-1 OFF.

168. On either DSKY verify that the COMP ACTY light is ON.

169. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M31 and N21.

170. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

171. Press CH30-1 OFF.

172. On either DSKY verify that the COMP ACTY and TRACKER lights are ON.

173. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

174. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

175. Press CH30-1 OFF.

176. On either DSKY verify that the COMP ACTY and PROGRAM lights are ON.

177. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

178. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

179. Press CH30-1 OFF.

180. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

181. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

182. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

183. Press CH30-15 and CH30-1 OFF.

184. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

185. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

186. Press CH30-15 and CH30-1 ON and verify that the lights of the two preceding steps go OFF.

187. Press CH30-1 OFF.

188. On either DSKY verify that the COMP ACTY, STBY and RESTART lights are ON.

189. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M32, M38, M39 and M40 N22, N26, N27 and N28.

190. Press CH30-1 ON.

---

191. Press ALARM RESET.

192. When the COMP ACTY light goes OFF, verify that all lights on the DSKY section of the XY Interface Panel are OFF.

193. Press CH30-1 OFF.

194. Set T12 and INHIBIT INCREMENT switches ON.

195. Stamp data sheet if the test was successfully completed. If a failure occurred during this test repeat all steps starting with step 140. If a second failure occurs, discontinue further testing.

PROGRAM ANALYSIS - DSKY DISPLAY

The DSKY Test is a fully automatic test routine which starts in Bank 5, Location 1400 and is applicable to both DSKY's. The sequence of program functions are performed in the order listed below.

a. Clears all DSKY Indicators and Display Registers.

b. Lights DSKY Indicators one at a time in the order listed below:

1.	UPLINK	5.	GIMBAL LOCK
2.	NO ATT	6.	PROG
3.	KEY REL (Flashing)	7.	TRACKER
4.	TEMP	8.	OPR ERR (Flashing)

c. Lights DSKY Indicators RESTART and STBY together.

d. Lights entire panel with KEY REL and OPR ERR flashing.

e. Turns on DSKY COMP ACTY indicator. (This indicator will remain on for the DSKY Register test.

f. Writes +00000 into DSKY Registers 1, 2, and 3 and flashes 00 in the VERB and NOUN displays.

g. Writes -11111 into DSKY Registers 1, 2, and 3 and flashes 11 in the VERB and NOUN displays.

h. Writes +22222 into DSKY Registers 1, 2, and 3 and flashes 22 in the VERB and NOUN displays.

i. Writes -33333 into DSKY Registers 1, 2, and 3 and flashes 33 in the VERB and NOUN displays.

j. Writes +44444 into DSKY Registers 1, 2, and 3 and flashes 44 in the VERB and NOUN displays.

k. Writes -55555 into DSKY Registers 1, 2, and 3 and flashes 55 in the VERB and NOUN displays.

l. Writes +66666 into DSKY Registers 1, 2, and 3 and flashes 66 in the VERB and NOUN displays.

m. Writes -77777 into DSKY Registers 1, 2, and 3 and flashes 77 in the VERB and NOUN displays.

n. Writes +88888 into DSKY Registers 1, 2, and 3 and flashes 88 in the VERB and NOUN displays.

o. Writes -99999 into DSKY Registers 1, 2, and 3 and flashes 99 in the VERB and NOUN displays.

---

p. Displays 70707 alternating with 07070 on the REG SEL display (with register select switch set to L). This display will be presented for 15 seconds, after which time the entire test will automatically repeat. The T12 COUNTER STOP switch should be set to the ON position during this display, so that all DSKY displays will be in the clear condition at the conclusion of testing. Success or failure of this test is determined visually by the operator noting that all displays occur as specified.

196. Transfer Control to Bank 5, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

197. Press the MONITOR indicator switch to the on (illuminated) position and set the register select switch to the L position.

198. Press the CL Key.

199. Set the T12 COUNTER STOP switch to the OFF position.

200. Set the INHIBIT INCREMENTS switch to the OFF position.

201. Press the PROCEED button.

202. Verify that the DSKY UPLINK ACTY indicator turns on.

203. Verify that DSKY indicator:
UPLINK ACTY turns off
NO ATT turns on

204. Verify that DSKY indicator:
NO ATT turns off
KEY REL turns on and is flashing

205. Verify that DSKY indicator:
KEY REL turns off
TEMP turns on

206. Verify that DSKY indicator:
TEMP turns off
GIMBAL LOCK turns on

207. Verify that DSKY indicator:
GIMBAL LOCK turns off
PROG turns on

208. Verify that DSKY indicator:
PROG turns off
TRACKER turns on

209. Verify that TRACKER indicator turns off

210. Verify that DSKY
OPR ERR indicator turns on and is flashing

211. Verify that DSKY indicator:
OPR ERR turns off
RESTART and STBY turn on together

212. Verify that all of the DSKY indicators mentioned above, are on with the KEY REL and OPR ERR indicators flashing:

213. Verify that the DSKY COMP ACTY indicator turns on. This indicator should remain on for the rest of the test.

---

214. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +00000
Register 2 = +00000
Register 3 = +00000
VERB = 00 (Flashing)
NOUN = 00 (Flashing)

215. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -11111
Register 2 = -11111
Register 3 = -11111
VERB = 11 (Flashing)
NOUN = 11 (Flashing)

216. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +22222
Register 2 = +22222
Register 3 = +22222
VERB = 22 (Flashing)
NOUN = 22 (Flashing)

217. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -33333
Register 2 = -33333
Register 3 = -33333
VERB = 33 (Flashing)
NOUN = 33 (Flashing)

218. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +44444
Register 2 = +44444
Register 3 = +44444
VERB = 44 (Flashing)
NOUN = 44 (Flashing)

219. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -55555
Register 2 = -55555
Register 3 = -55555
VERB = 55 (Flashing)
NOUN = 55 (Flashing)

220. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +66666
Register 2 = +66666
Register 3 = +66666
VERB = 66 (Flashing)
NOUN = 66 (Flashing)

221. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -77777
Register 2 = -77777
Register 3 = -77777
VERB = 77 (Flashing)
NOUN = 77 (Flashing)

222. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +88888
Register 2 = +88888
Register 3 = +88888
VERB = 88 (Flashing)
NOUN = 88 (Flashing)

223. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -99999
Register 2 = -99999
Register 3 = -99999
VERB = 99 (Flashing)
NOUN = 99 (Flashing)

224. Verify that the DSKY display is clear, and the REG SEL display is 70707 alternating with 07070. Set the T12 COUNTER STOP switch to the ON position immediately after verifying the REG SEL display. If a failure was observed during this test, do not turn ON the T12 COUNTER STOP switch. Allow the test program to recycle twice, and if the malfunction is still present, discontinue further testing. Stop the computer coincident with the REG SEL display, as described above.

225. Set the INHIBIT INCREMENT switch to the ON position.

226. Press the FRESH START button and stamp data sheet if the test was successful.

227. Proceed to the CSS Power Turn-off section of JDC 05420. (See Figure 1 of JDC 05770).

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05783 JDC
REV. A
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
136.	Channels 30, 31, and 32 test (steps 7 through 136) completed successfully.		
195.	DSKY Spacecraft Signals (steps 139 through 195) completed successfully.		
226.	DSKY Display test (steps 196 through 225) completed successfully.		

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-ALLEREST

JDC 05783 **REV.** B **PAGE** 1 **OF** 17
INITIAL TDRR 32809 **D.S. PGS** 1

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

Program ALLEREST contains three separate tests, the first of which tests the operation of Channels 30, 31, and 32. The next test checks the operation of the DSKY relays used to transmit signals to the spacecraft. The last test checks the operation of the DSKY Indicators and Display Registers. It is recommended that the Program Analysis sections of this JDC be reviewed prior to testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-7-67	34517	4, 10, 12-17	All	EA	-
B	11-16-67	35057	3-10, 12, 15	-	EA	-

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program ALLEREST
Mylar Tape, JDC 05784

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the RDC Interface panel of the CTS.

3. Load PROGRAM ALLEREST (JDC 05784) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407, Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

PROGRAM ANALYSIS - CHANNELS 30, 31, AND 32

The programmed functions of this portion of the test checks that Channels 30, 31, and 32 receive DC signals in the proper bit positions via the Interface Module. Initially, the Program verifies that all the Bit Positions of Channels 30, 31, and 32 are de-energized. When this check is successfully completed,

VERIFICATION WITH SIDL REQUIRED BEFORE USE

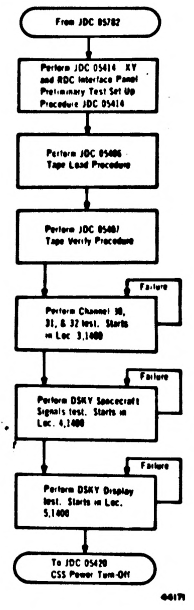
From JDC 05782
Perform JDC 05414 XY and RDC Interface Panel Preliminary Test Set Up Procedure JDC 05414
Perform JDC 05406 Tape Load Procedure
Perform JDC 05407 Tape Verify Procedure
Failure
Perform Channel 30, 31, & 32 test. Starts in Loc 3,1400
Failure
Perform DSKY Spacecraft Signals test. Starts in Loc. 4,1400
Failure
Perform DSKY Display test. Starts in Loc. 5,1400
To JDC 05420 CSS Power Turn-Off
44171

Figure 1. Flowchart for Performing Program ALLEREST

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the Program will turn off the DSKY COMP ACTY indicator. Extinguishing COMP ACTY is a signal to the operator to start the switching sequence at the RDC Panel, beginning with CH30-1.

At this point and throughout the remainder of the switching sequence the Program looks for a switch to be energized. When the Program detects an actuation it enters a routine to determine that it was the proper switch, and checks the other two Channels to make sure that they do not have bits present. If no discrepancies are noted during these checks, the Computer will turn on the DSKY COMP ACTY indicator, and Register A will present a five second flashing display. (All bits will flash except the one under test.) At the end of this period the Program will turn off the DSKY COMP ACTY indicator signaling the operator to de-energize the switch just tested and energize the next switch to the left (in this case CH30-2). During the test the number of the Channel under test will appear in the DSKY VERB display.

When one Channel has been completely tested, the test is continued by actuating switch number one of the next Channel. The last switch energized in the sequence is CH32-10. After this Bit is tested the Program will switch to the success routine which will be displayed on Register L as 70707 alternating with 07070.

The DSKY indications used in this test and their interpretation are listed below.

NO ATT	Operator failed to energize the next test bit within one minute of completion of testing of last bit.
KEY RELEASE	Two adjacent switches are energized together for 30 seconds. This situation occurs when the operator energizes the switch to be tested before he de-energized the previous switch which was just checked.

If any error condition occurs the operator Transfers Control back to location 3, 1400 and reruns the test again. If the error resulted from improper operation of the Hardware under test, and a second error occurs, discontinue further testing.

7. Transfer Control to E Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

8. Press the MONITOR indicator switch to the on (illuminated) position.

9. Press the CL Key.

10. Set the T12 COUNTER STOP switch to the OFF position.

11. Set the INHIBIT INCREMENTS switch to the OFF position.

12. Press the PROCEED button.

13. Verify that the DSKY COMP ACTY indicator switches off.

NOTE: CH30, 31, and 32 are alternate-action indicator switches which are illuminated in the energized position. To turn on any switch press to the illuminated position. To turn off any switch press to the extinguished position.

14. If an error condition occurs in any part of this test, perform steps 137 and 138.

15. Press CH30-1/IN0-1 to the on (illuminated) position.

---

16. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

17. Press CH30-1/IN0-1 to the off position.

18. Press CH30-2/IN0-2 to the on position.

19. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

20. Press CH30-2/IN0-2 to the off position.

21. Press CH30-3/IN0-3 to the on position.

22. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

23. Press CH30-3/IN0-3 to the off position.

24. Press CH30-4/IN0-4 to the on position.

25. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

26. Press CH30-4/IN0-4 to the off position.

27. Press CH30-5/IN0-5 to the on position.

28. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

29. Press CH30-5/IN0-5 to the off position.

30. Press CH30-6/IN0-6 to the on position.

31. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

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32. Press CH30-6/IN0-6 to the off position.

33. Press CH30-7/IN0-7 to the on position.

34. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

35. Press CH30-7/IN0-7 to the off position.

36. Press CH30-8/IN0-8 to the on position.

37. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

38. Press CH30-8/IN0-8 to the off position.

39. Press CH30-9/IN0-9 to the on position.

40. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

41. Press CH30-9/IN0-9 to the off position.

42. Press CH30-10/IN0-10 to the on position.

43. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

44. Press CH30-10/IN0-10 to the off position.

45. Press CH30-11/IN0-11 to the on position.

46. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

47. Press CH30-11/IN0-11 to the off position.

48. Press CH30-12/IN0-12 to the on position.

49. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

50. Press CH30-12/IN0-12 to the off position.

51. Press CH30-13/IN0-13 to the on position.

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52. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

53. Press CH30-13/IN0-13 to the off position.

54. Press CH30-14/IN0-14 to the on position.

55. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

56. Press CH30-14/IN0-14 to the off position.

57. Press CH30-15/IN0-15 to the on position.

58. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

59. Press CH30-15/IN0-15 to the off position.

60. Press CH31-1/IN2-1 to the on position.

61. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

62. Press CH31-1/IN2-1 to the off position.

63. Press CH31-2/IN2-2 to the on position.

64. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

65. Press CH31-2/IN2-2 to the off position.

66. Press CH31-3/IN2-3 to the on position.

67. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

68. Press CH31-3/IN2-3 to the off position.

69. Press CH31-4/IN2-4 to the on position.

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70. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

71. Press CH31-4/IN2-4 to the off position.

72. Press CH31-5/IN2-5 to the on position.

73. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

74. Press CH31-5/IN2-5 to the off position.

75. Press CH31-6/IN2-6 to the on position.

76. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

77. Press CH31-6/IN2-6 to the off position.

78. Press CH31-7/IN2-7 to the on position.

79. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

80. Press CH31-7/IN2-7 to the off position.

81. Press CH31-8/IN2-8 to the on position.

82. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

83. Press CH31-8/IN2-8 to the off position.

84. Press CH31-9/IN2-9 to the on position.

85. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

86. Press CH31-9/IN2-9 to the off position.

87. Press CH31-10/IN2-10 to the on position.

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88. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

89. Press CH31-10/IN2-10 to the off position.

90. Press CH31-11/IN2-11 to the on position.

91. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

92. Press CH31-11/IN2-11 to the off position.

93. Press CH31-12/IN2-12 to the on position.

94. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

95. Press CH31-12/IN2-12 to the off position.

96. Press CH31-13/IN2-13 to the on position.

97. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

98. Press CH31-13/IN2-13 to the off position.

99. Press CH31-14/IN2-14 to the on position.

100. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

101. Press CH31-14/IN2-14 to the off position.

102. Press CH31-15/IN2-15 to the on position.

103. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

104. Press CH31-15/IN2-15 to the off position.

105. Press CH32-1/IN3-1 to the on position.

106. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

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107. Press CH32-1/IN3-1 to the off position.

108. Press CH32-2/IN3-2 to the on position.

109. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

110. Press CH32-2/IN3-2 to the off position.

111. Press CH32-3/IN3-3 to the on position.

112. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

113. Press CH32-3/IN3-3 to the off position.

114. Press CH32-4/IN3-4 to the on position.

115. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

116. Press CH32-4/IN3-4 to the off position.

117. Press CH32-5/IN3-5 to the on position.

118. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

119. Press CH32-5/IN3-5 to the off position.

120. Press CH32-6/IN3-6 to the on position.

121. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

122. Press CH32-6/IN3-6 to the off position.

123. Press CH32-7/IN3-7 to the on position.

124. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

125. Press CH32-7/IN3-7 to the off position.

126. Press CH32-8/IN3-8 to the on position.

127. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

---

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

128. Press CH32-8/IN3-8 to the off position.

129. Press CH32-9/IN3-9 to the on position.

130. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

131. Press CH32-9/IN3-9 to the off position.

132. Press CH32-10/IN3-10 to the on position.

133. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

134. Press CH32-10/IN3-10 to the off position.

135. Set the register select switch to the L position.

136. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this section of the test has been successfully completed. Stamp data sheet and proceed to step 139 of this JDC.

137. Set the T12 COUNTER STOP switch to the on position.

138. Starting with step 7, perform the procedures of this JDC again. If the failure occurs again discontinue further testing.

PROGRAM ANALYSIS - DSKY SPACECRAFT SIGNALS

This program exercises the DSKY Relays which transmit discrete signals to the spacecraft. This section of the ALLEREST program is composed of 12 test exercises which activate certain DSKY Relays in turn producing a visual indication on the MAIN and NAV DSKY sections of the CTS Interface panel. Tests are performed incrementally with the program pausing at the conclusion of each test to signal the operator with the COMP ACTY light that it is waiting to perform the next test. The operator allows the next test to be performed by pressing Bit 1 of Channel 30 (RDC Interface) twice. Bit 1 of Channel 30 is an alternate action switch which is off initially. On the first actuation Bit 1 is turned on allowing the program to extinguish COMP ACTY. Then the program waits for the next (off) actuation of Bit 1. When Bit 1 is switched off the program will perform the next test. The first set of procedures described under 1 below are concerned with initialization procedures.

---

1. Program Initialization Routine

a. Turns on DSKY RESTART (Bit 10, Channel 11) light.

b. Switches to ALRMOFF (Location 1465) which in sequence performs the following:

1. Load 60000 into Channel 10, turning off DSKY indicators PROGRAM, TRACKER, GIMBAL LOCK, NO ATT, FREE HOLD, and AUTO.

2. Stores return address (Q) in 0112.

3. Writes PZ (positive zero) into Channels 12, 13, and 33.

4. Reads and Masks Bit 14 of Channel 33 (WARNING light).

5. Tests Bit 14 for the off condition and if true loads PZ into Channel 11 turning off the RESTART light.

6. Switches back to the return address as stored in 0112.

c. Loads PZ into the Index location (TESEL).

d. Switches out to COMPON (location 1515) where it writes 00002 into Channel 11 turning on the COMP ACTY light.

The COMPON and ALRM OFF subroutines are used as integral portions of the test routine described below. The program procedures described under 5 are valid for any test being performed in this section with the only difference being the end result, i.e., the actual indicators illuminated on the DSKY and on the XY Interface panel of the CTS.

2. Program Testing Routine

a. Turn on COMP ACTY. Read Channel 30 and Mask with Bit one and test results with a CCS.

b. If the operator has not pushed the button the program stays in a loop which continues to RDCH30 and test for the anticipated switch actuation.

c. When the switch (Bit 1 CH30) is actuated the program switches to the ALRM OFF subroutine resetting the COMP ACTY light.

d. The program then switches back to the main program and the next instruction is another RDCH30. Channel 30 is read and Masked with bit one and tested with another CCS instruction (at 1414), but this time the test is for a PZ (positive zero) accumulator, indicating that the operator has de-energized Bit of CH30.

e. The CCS instruction above switches the program to an Index (location 1542) instruction. The Index location (TESEL) in combination with the TC (to 1525) to the test table (TSTAB) instruction provides a switch which selects the next test (in sequence) from the table.

f. TSTAB will switch the program into the proper test subroutine which will set up the DSKY Relay word to illuminate the specified indicators.

g. After the indicators have been turned on the program will increment TESEL (Index) so that the next location in the test table will be selected after the operator repeats the on-off switching sequence of Bit 1 Channel 30. The program will loop back to (a) above and repeat (a) through (g) for the next test sequence.

There is no success display provided at the end of this particular section of the ALLEREST. The test will be completed successfully if all of the indicators and alarms specified in the steps below illuminate and extinguish in accordance with the procedure.

139. Set the T12 COUNTER STOP switch to the ON position.

140. Transfer Control to E Bank 4, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

141. Press RDC Interface switch CH30-15/IN0-15 to the on (illuminated) position.

142. Press the MONITOR indicator switch to the on (illuminated) position.

143. Press the CL Key.

144. Set switches INHIBIT INCREMENTS and T12 COUNTER STOP to the OFF position.

145. Press the ALARM RESET button, then the PROCEED button.

146. When the COMP ACT light appears on either DSKY, verify the following:

a. All lights are OFF in the MAIN DSKY section of the XY Interface Panel.

b. All lights are OFF in the NAV DSKY section of the XY Interface Panel.

c. All alarm lights on the DSKY are OFF.

NOTE: RDC Interface switch CH30-1 is an alternate action indicator switch which is illuminated in the on state and extinguished in the off state. When performing any steps which require CH30-1 to be turned on and off, allow an approximate 3 second delay between switch actuations.

Omit NAV DSKY callouts in the following steps if this procedure is being performed during LM CSS checkout.

147. Press the CH30-1 on and then off.

148. On either DSKY verify that the COMP ACTY light is ON.

149. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M37, M42, N25, and N30.

150. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

151. Press CH30-1 OFF.

152. On either DSKY verify that the COMP ACTY light is on.

153. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M34 and N20.

154. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

155. Press CH30-1 OFF.

156. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M36 and N19.

157. On either DSKY verify that the COMP ACTY light is ON.

158. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

159. Press CH30-1 OFF.

160. On either DSKY verify that the COMP ACTY light is ON.

161. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M41 and N29.

162. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

163. Press CH30-1 OFF.

164. On either DSKY verify that the COMP ACTY and GIMBAL LOCK lights are ON.

165. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

166. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

167. Press CH30-1 OFF.

168. On either DSKY verify that the COMP ACTY light is ON.

169. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M31 and N21.

170. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

171. Press CH30-1 OFF.

172. On either DSKY verify that the COMP ACTY and TRACKER lights are ON.

173. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

174. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

175. Press CH30-1 OFF.

176. On either DSKY verify that the COMP ACTY and PROGRAM lights are ON.

177. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

178. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

179. Press CH30-1 OFF.

180. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

181. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

182. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

183. Press CH30-15 and CH30-1 OFF.

184. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

185. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

186. Press CH30-15 and CH30-1 ON and verify that the lights of the two preceding steps go OFF.

187. Press CH30-1 OFF.

188. On either DSKY verify that the COMP ACTY, STBY and RESTART lights are ON.

189. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M32, M38, M39 and M40 N22, N26, N27 and N28.

190. Press CH30-1 ON.

191. Press ALARM RESET.

192. When the COMP ACTY light goes OFF, verify that all lights on the DSKY section of the XY Interface Panel are OFF.

193. Press CH30-1 OFF.

194. Set T12 and INHIBIT INCREMENT switches ON.

195. Stamp data sheet if the test was successfully completed. If a failure occurred during this test repeat all steps starting with step 140. If a second failure occurs, discontinue further testing.

PROGRAM ANALYSIS - DSKY DISPLAY

The DSKY Test is a fully automatic test routine which starts in Bank 5, Location 1400 and is applicable to both DSKY's. The sequence of program functions are performed in the order listed below.

a. Clears all DSKY Indicators and Display Registers.

b. Lights DSKY Indicators one at a time in the order listed below:

1. UPLINK	5. GIMBAL LOCK
2. NO ATT	6. PROG
3. KEY REL (Flashing)	7. TRACKER
4. TEMP	8. OPR ERR (Flashing)

c. Lights DSKY Indicators RESTART and STBY together.

d. Lights entire panel with KEY REL and OPR ERR flashing.

e. Turns on DSKY COMP ACTY indicator. (This indicator will remain on for the DSKY Register test.

f. Writes +00000 into DSKY Registers 1, 2, and 3 and flashes 00 in the VERB and NOUN displays.

g. Writes -11111 into DSKY Registers 1, 2, and 3 and flashes 11 in the VERB and NOUN displays.

h. Writes +22222 into DSKY Registers 1, 2, and 3 and flashes 22 in the VERB and NOUN displays.

i. Writes -33333 into DSKY Registers 1, 2, and 3 and flashes 33 in the VERB and NOUN displays.

j. Writes +44444 into DSKY Registers 1, 2, and 3 and flashes 44 in the VERB and NOUN displays.

k. Writes -55555 into DSKY Registers 1, 2, and 3 and flashes 55 in the VERB and NOUN displays.

l. Writes +66666 into DSKY Registers 1, 2, and 3 and flashes 66 in the VERB and NOUN displays.

m. Writes -77777 into DSKY Registers 1, 2, and 3 and flashes 77 in the VERB and NOUN displays.

n. Writes +88888 into DSKY Registers 1, 2, and 3 and flashes 88 in the VERB and NOUN displays.

o. Writes -99999 into DSKY Registers 1, 2, and 3 and flashes 99 in the VERB and NOUN displays.

p. Displays 70707 alternating with 07070 on the REG SEL display (with register select switch set to L). This display will be presented for 15 seconds, after which time the entire test will automatically repeat. The T12 COUNTER STOP switch should be set to the ON position during this display, so that all DSKY displays will be in the clear condition at the conclusion of testing. Success or failure of this test is determined visually by the operator noting that all displays occur as specified.

196. Transfer Control to E Bank 5, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

197. Press the MONITOR indicator switch to the on (illuminated) position and set the register select switch to the L position.

198. Press the CL Key.

199. Set the T12 COUNTER STOP switch to the OFF position.

200. Set the INHIBIT INCREMENTS switch to the OFF position.

201. Press the PROCEED button.

202. Verify that the DSKY UPLINK ACTY indicator turns on.

203. Verify that DSKY indicator:
UPLINK ACTY turns off
NO ATT turns on

204. Verify that DSKY indicator:
NO ATT turns off
KEY REL turns on and is flashing

205. Verify that DSKY indicator:
KEY REL turns off
TEMP turns on

206. Verify that DSKY indicator:
TEMP turns off
GIMBAL LOCK turns on

207. Verify that DSKY indicator:
GIMBAL LOCK turns off
PROG turns on

208. Verify that DSKY indicator:
PROG turns off
TRACKER turns on

209. Verify that TRACKER indicator turns off

210. Verify that DSKY OPR ERR indicator turns on and is flashing

211. Verify that DSKY indicator:
OPR ERR turns off
RESTART and STBY turn on together

212. Verify that all of the DSKY indicators mentioned above, are on with the KEY REL and OPR ERR indicators flashing:

213. Verify that the DSKY COMP ACTY indicator turns on. This indicator should remain on for the rest of the test.

214. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +00000
Register 2 = +00000
Register 3 = +00000
VERB = 00 (Flashing)
NOUN = 00 (Flashing)

215. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -11111
Register 2 = -11111
Register 3 = -11111
VERB = 11 (Flashing)
NOUN = 11 (Flashing)

216. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +22222
Register 2 = +22222
Register 3 = +22222
VERB = 22 (Flashing)
NOUN = 22 (Flashing)

217. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -33333
Register 2 = -33333
Register 3 = -33333
VERB = 33 (Flashing)
NOUN = 33 (Flashing)

218. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +44444
Register 2 = +44444
Register 3 = +44444
VERB = 44 (Flashing)
NOUN = 44 (Flashing)

219. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -55555
Register 2 = -55555
Register 3 = -55555
VERB = 55 (Flashing)
NOUN = 55 (Flashing)

220. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +66666
Register 2 = +66666
Register 3 = +66666
VERB = 66 (Flashing)
NOUN = 66 (Flashing)

221. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -77777
Register 2 = -77777
Register 3 = -77777
VERB = 77 (Flashing)
NOUN = 77 (Flashing)

222. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +88888
Register 2 = +88888
Register 3 = +88888
VERB = 88 (Flashing)
NOUN = 88 (Flashing)

223. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -99999
Register 2 = -99999
Register 3 = -99999
VERB = 99 (Flashing)
NOUN = 99 (Flashing)

224. Verify that the DSKY display is clear, and the REG SEL display is 70707 alternating with 07070. Set the T12 COUNTER STOP switch to the ON position immediately after verifying the REG SEL display. If a failure was observed during this test, do not turn ON the T12 COUNTER STOP switch. Allow the test program to recycle twice, and if the malfunction is still present, discontinue further testing. Stop the computer coincident with the REG SEL display, as described above.

225. Set the INHIBIT INCREMENT switch to the ON position.

226. Press the FRESH START button and stamp data sheet if the test was successful.

227. Proceed to the CSS Power Turn-off section of JDC 05420. (See Figure 1 of JDC 05770).

DATE 26 JAN 67

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

NO. 05783 JDC
REV. B
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

ASSEMBLY UNDER TEST

TITLE ____

SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION

TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE

NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
136.	Channels 30, 31, and 32 test (steps 7 through 136) completed successfully.		
195.	DSKY Spacecraft Signals (steps 139 through 195) completed successfully.		
→ 226.	DSKY Display test (steps 196 through 225) completed successfully.		

DATE 26 JAN 67

JOB OPERATING PROCEDURE FOR (FVP)
PROGRAM-ALLEREST

JDC 05783 **REV.** C **PAGE** 1 **OF** 17
INITIAL TDRR 32809 **D.S. PGS** -

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

Program ALLEREST contains three separate tests, the first of which tests the operation of Channels 30, 31, and 32. The next test checks the operation of the DSKY relays used to transmit signals to the spacecraft. The last test checks the operation of the DSKY Indicators and Display Registers. It is recommended that the Program Analysis sections of this JDC be reviewed prior to testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-7-67	34517	4, 10, 12-17	All	EA	-
B	11-16-67	35057	3-10, 12, 15	-	EA	-
C	3-22-68	35899	1, 12, 17	-	EA	-

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program ALLEREST
Mylar Tape, JDC 05784

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414. Depress LAMP TEST pushbutton on the Self Test panel and verify all indicators on the XY Interface panel illuminate.

> NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the RDC Interface panel of the CTS.

3. Load PROGRAM ALLEREST (JDC 05784) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

> NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407, Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

PROGRAM ANALYSIS - CHANNELS 30, 31, AND 32

The programmed functions of this portion of the test checks that Channels 30, 31, and 32 receive DC signals in the proper bit positions via the Interface Module. Initially, the Program verifies that all the Bit Positions of Channels 30, 31, and 32 are de-energized. When this check is successfully completed

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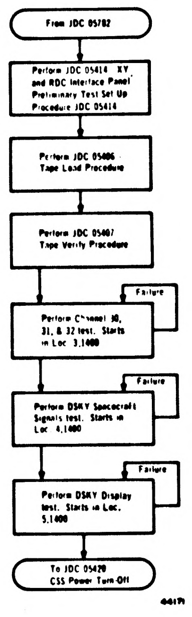
From JDC 05782
Perform JDC 05414 XY and RDC Interface Panel Preliminary Test Set Up Procedure JDC 05414
Perform JDC 05406 Tape Load Procedure
Perform JDC 05407 Tape Verify Procedure
Perform Channel 30, 31, & 32 test. Starts in Loc 3,1400
Failure
Perform DSKY Spacecraft Signals test. Starts in Loc 4,1400
Failure
Perform DSKY Display test. Starts in Loc. 5,1400
Failure
To JDC 05420 CSS Power Turn-Off
44179

Figure 1. Flowchart for Performing Program ALLEREST

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the Program will turn off the DSKY COMP ACTY indicator. Extinguishing COMP ACTY is a signal to the operator to start the switching sequence at the RDC Panel, beginning with CH30-1.

At this point and throughout the remainder of the switching sequence the Program looks for a switch to be energized. When the Program detects an actuation it enters a routine to determine that it was the proper switch, and checks the other two Channels to make sure that they do not have bits present. If no discrepancies are noted during these checks, the Computer will turn on the DSKY COMP ACTY indicator, and Register A will present a five second flashing display. (All bits will flash except the one under test.) At the end of this period the Program will turn off the DSKY COMP ACTY indicator signaling the operator to de-energize the switch just tested and energize the next switch to the left (in this case CH30-2). During the test the number of the Channel under test will appear in the DSKY VERB display.

When one Channel has been completely tested, the test is continued by actuating switch number one of the next Channel. The last switch energized in the sequence is CH32-10. After this Bit is tested the Program will switch to the success routine which will be displayed on Register L as 70707 alternating with 07070.

The DSKY indications used in this test and their interpretation are listed below.

NO ATT	Operator failed to energize the next test bit within one minute of completion of testing of last bit.
KEY RELEASE	Two adjacent switches are energized together for 30 seconds. This situation occurs when the operator energizes the switch to be tested before he de-energized the previous switch which was just checked.

If any error condition occurs the operator Transfers Control back to location 3,1400 and reruns the test again. If the error resulted from improper operation of the Hardware under test, and a second error occurs, discontinue further testing.

7. Transfer Control to E Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

8. Press the MONITOR indicator switch to the on (illuminated) position.

9. Press the CL Key.

10. Set the T12 COUNTER STOP switch to the OFF position.

11. Set the INHIBIT INCREMENTS switch to the OFF position.

12. Press the PROCEED button.

13. Verify that the DSKY COMP ACTY indicator switches off.

> NOTE: CH30, 31, and 32 are alternate-action indicator switches which are illuminated in the energized position. To turn on any switch press to the illuminated position. To turn off any switch press to the extinguished position.

14. If an error condition occurs in any part of this test, perform steps 137 and 138.

15. Press CH30-1/IN0-1 to the on (illuminated) position.

---

16. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

17. Press CH30-1/IN0-1 to the off position.

18. Press CH30-2/IN0-2 to the on position.

19. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

20. Press CH30-2/IN0-2 to the off position.

21. Press CH30-3/IN0-3 to the on position.

22. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

23. Press CH30-3/IN0-3 to the off position.

24. Press CH30-4/IN0-4 to the on position.

25. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

26. Press CH30-4/IN0-4 to the off position.

27. Press CH30-5/IN0-5 to the on position.

28. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

29. Press CH30-5/IN0-5 to the off position.

30. Press CH30-6/IN0-6 to the on position.

31. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

32. Press CH30-6/IN0-6 to the off position.

33. Press CH30-7/IN0-7 to the on position.

34. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

35. Press CH30-7/IN0-7 to the off position.

36. Press CH30-8/IN0-8 to the on position.

37. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

38. Press CH30-8/IN0-8 to the off position.

39. Press CH30-9/IN0-9 to the on position.

40. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

41. Press CH30-9/IN0-9 to the off position.

42. Press CH30-10/IN0-10 to the on position.

43. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

44. Press CH30-10/IN0-10 to the off position.

45. Press CH30-11/IN0-11 to the on position.

46. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

47. Press CH30-11/IN0-11 to the off position.

48. Press CH30-12/IN0-12 to the on position.

49. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

50. Press CH30-12/IN0-12 to the off position.

51. Press CH30-13/IN0-13 to the on position.

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52. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

53. Press CH30-13/IN0-13 to the off position.

54. Press CH30-14/IN0-14 to the on position.

55. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

56. Press CH30-14/IN0-14 to the off position.

57. Press CH30-15/IN0-15 to the on position.

58. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

59. Press CH30-15/IN0-15 to the off position.

60. Press CH31-1/IN2-1 to the on position.

61. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

62. Press CH31-1/IN2-1 to the off position.

63. Press CH31-2/IN2-2 to the on position.

64. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

65. Press CH31-2/IN2-2 to the off position.

66. Press CH31-3/IN2-3 to the on position.

67. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

68. Press CH31-3/IN2-3 to the off position.

69. Press CH31-4/IN2-4 to the on position.

---

70. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

71. Press CH31-4/IN2-4 to the off position.

72. Press CH31-5/IN2-5 to the on position.

73. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

74. Press CH31-5/IN2-5 to the off position.

75. Press CH31-6/IN2-6 to the on position.

76. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

77. Press CH31-6/IN2-6 to the off position.

78. Press CH31-7/IN2-7 to the on position.

79. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

80. Press CH31-7/IN2-7 to the off position.

81. Press CH31-8/IN2-8 to the on position.

82. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

83. Press CH31-8/IN2-8 to the off position.

84. Press CH31-9/IN2-9 to the on position.

85. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

86. Press CH31-9/IN2-9 to the off position.

87. Press CH31-10/IN2-10 to the on position.

---

88. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

89. Press CH31-10/IN2-10 to the off position.

90. Press CH31-11/IN2-11 to the on position.

91. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

92. Press CH31-11/IN2-11 to the off position.

93. Press CH31-12/IN2-12 to the on position.

94. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

95. Press CH31-12/IN2-12 to the off position.

96. Press CH31-13/IN2-13 to the on position.

97. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

98. Press CH31-13/IN2-13 to the off position.

99. Press CH31-14/IN2-14 to the on position.

100. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

101. Press CH31-14/IN2-14 to the off position.

102. Press CH31-15/IN2-15 to the on position.

103. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

104. Press CH31-15/IN2-15 to the off position.

105. Press CH32-1/IN3-1 to the on position.

106. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

107. Press CH32-1/IN3-1 to the off position.

108. Press CH32-2/IN3-2 to the on position.

109. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

110. Press CH32-2/IN3-2 to the off position.

111. Press CH32-3/IN3-3 to the on position.

112. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

113. Press CH32-3/IN3-3 to the off position.

114. Press CH32-4/IN3-4 to the on position.

115. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

116. Press CH32-4/IN3-4 to the off position.

117. Press CH32-5/IN3-5 to the on position.

118. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

119. Press CH32-5/IN3-5 to the off position.

120. Press CH32-6/IN3-6 to the on position.

121. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

122. Press CH32-6/IN3-6 to the off position.

123. Press CH32-7/IN3-7 to the on position.

124. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

125. Press CH32-7/IN3-7 to the off position.

126. Press CH32-8/IN3-8 to the on position.

127. Verify that the following displays occur

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

---

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

128. Press CH32-8/IN3-8 to the off position.

129. Press CH32-9/IN3-9 to the on position.

130. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

131. Press CH32-9/IN3-9 to the off position.

132. Press CH32-10/IN3-10 to the on position.

133. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

134. Press CH32-10/IN3-10 to the off position.

135. Set the register select switch to the L position.

136. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this section of the test has been successfully completed. Stamp data sheet and proceed to step 139 of this JDC.

137. Set the T12 COUNTER STOP switch to the on position.

138. Starting with step 7, perform the procedures of this JDC again. If the failure occurs again discontinue further testing.

PROGRAM ANALYSIS - DSKY SPACECRAFT SIGNALS

This program exercises the DSKY Relays which transmit discrete signals to the spacecraft. This section of the ALLEREST program is composed of 12 test exercises which activate certain DSKY Relays in turn producing a visual indication on the MAIN and NAV DSKY sections of the CTS Interface panel. Tests are performed incrementally with the program pausing at the conclusion of each test to signal the operator with the COMP ACTY light that it is waiting to perform the next test. The operator allows the next test to be performed by pressing Bit 1 of Channel 30 (RDC Interface) twice. Bit 1 of Channel 30 is an alternate action switch which is off initially. On the first actuation Bit 1 is turned on allowing the program to extinguish COMP ACTY. Then the program waits for the next (off) actuation of Bit 1. When Bit 1 is switched off the program will perform the next test. The first set of procedures described under 1 below are concerned with initialization procedures.

---

1. Program Initialization Routine

a. Turns on DSKY RESTART (Bit 10, Channel 11) light.

b. Switches to ALRMOFF (Location 1465) which in sequence performs the following:

1. Load 60000 into Channel 10, turning off DSKY indicators PROGRAM, TRACKER, GIMBAL LOCK, NO ATT, FREE HOLD, and AUTO.

2. Stores return address (Q) in 0112.

3. Writes PZ (positive zero) into Channels 12, 13, and 33.

4. Reads and Masks Bit 14 of Channel 33 (WARNING light).

5. Tests Bit 14 for the off condition and if true loads PZ into Channel 11 turning off the RESTART light.

6. Switches back to the return address as stored in 0112.

c. Loads PZ into the Index location (TESEL).

d. Switches out to COMPON (location 1515) where it writes 00002 into Channel 11 turning on the COMP ACTY light.

The COMPON and ALRM OFF subroutines are used as integral portions of the test routine described below. The program procedures described under 5 are valid for any test being performed in this section with the only difference being the end result, i.e., the actual indicators illuminated on the DSKY and on the XY Interface panel of the CTS.

2. Program Testing Routine

a. Turn on COMP ACTY. Read Channel 30 and Mask with Bit one and test results with a CCS.

b. If the operator has not pushed the button the program stays in a loop which continues to RDCH30 and test for the anticipated switch actuation.

c. When the switch (Bit 1 CH30) is actuated the program switches to the ALRM OFF subroutine resetting the COMP ACTY light.

d. The program then switches back to the main program and the next instruction is another RDCH30. Channel 30 is read and Masked with bit one and tested with another CCS instruction (at 1414), but this time the test is for a PZ (positive zero) accumulator, indicating that the operator has de-energized Bit of CH30.

e. The CCS instruction above switches the program to an Index (location 1542) instruction. The Index location (TESEL) in combination with the TC (to 1525) to the test table (TSTAB) instruction provides a switch which selects the next test (in sequence) from the table.

f. TSTAB will switch the program into the proper test subroutine which will set up the DSKY Relay word to illuminate the specified indicators.

g. After the indicators have been turned on the program will increment TESEL (Index) so that the next location in the test table will be selected after the operator repeats the on-off switching sequence of Bit 1 Channel 30. The program will loop back to (a) above and repeat (a) through (g) for the next test sequence.

There is no success display provided at the end of this particular section of the ALLEREST. The test will be completed successfully if all of the indicators and alarms specified in the steps below illuminate and extinguish in accordance with the procedure.

139. Set the T12 COUNTER STOP switch to the ON position.

140. Transfer Control to E Bank 4, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

141. Press RDC Interface switch CH30-15/IN0-15 to the on (illuminated) position. Verify TEMP alarm indicator on DSKY turns off.

142. Press the MONITOR indicator switch to the on (illuminated) position.

143. Press the CL Key.

144. Set switches INHIBIT INCREMENTS and T12 COUNTER STOP to the OFF position.

145. Press the PROCEED button, then the ALARM RESET button.

146. When the COMP ACT light (after a delay of approximately 10 seconds) appears on either DSKY, verify the following:

a. All lights are OFF in the MAIN DSKY section of the XY Interface Panel.

b. All lights are OFF in the NAV DSKY section of the XY Interface Panel.

c. All alarm lights on the DSKY are OFF.

NOTE: RDC Interface switch CH30-1 is an alternate action indicator switch which is illuminated in the on state and extinguished in the off state. When performing any steps which require CH30-1 to be turned on and off, allow an approximate 3 second delay between switch actuations.

Omit NAV DSKY callouts in the following steps if this procedure is being performed during LM CSS checkout.

147. Press the CH30-1 on and then off.

148. On either DSKY verify that the COMP ACTY light is ON.

149. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M37, M42, N25, and N30.

150. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

151. Press CH30-1 OFF.

152. On either DSKY verify that the COMP ACTY light is on.

153. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M34 and N20.

154. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

155. Press CH30-1 OFF.

156. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M36 and N19.

157. On either DSKY verify that the COMP ACTY light is ON.

158. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

159. Press CH30-1 OFF.

160. On either DSKY verify that the COMP ACTY light is ON.

161. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M41 and N29.

162. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

163. Press CH30-1 OFF.

164. On either DSKY verify that the COMP ACTY and GIMBAL LOCK lights are ON.

165. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

166. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

167. Press CH30-1 OFF.

168. On either DSKY verify that the COMP ACTY light is ON.

169. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M31 and N21.

170. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

171. Press CH30-1 OFF.

172. On either DSKY verify that the COMP ACTY and TRACKER lights are ON.

173. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

174. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

175. Press CH30-1 OFF.

176. On either DSKY verify that the COMP ACTY and PROGRAM lights are ON.

177. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

178. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

179. Press CH30-1 OFF.

180. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

181. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

182. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

183. Press CH30-15 and CH30-1 OFF.

184. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

185. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

186. Press CH30-15 and CH30-1 ON and verify that the lights of the two preceding steps go OFF.

187. Press CH30-1 OFF.

188. On either DSKY verify that the COMP ACTY, STBY and RESTART lights are ON.

189. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M32, M38, M39 and M40. N22, N26, N27 and N28.

190. Press CH30-1 ON.

191. Press ALARM RESET.

192. When the COMP ACTY light goes OFF, verify that all lights on the DSKY section of the XY Interface Panel are OFF.

193. Press CH30-1 OFF.

194. Set T12 and INHIBIT INCREMENT switches ON.

195. Stamp data sheet if the test was successfully completed. If a failure occurred during this test repeat all steps starting with step 140. If a second failure occurs, discontinue further testing.

PROGRAM ANALYSIS - DSKY DISPLAY

The DSKY Test is a fully automatic test routine which starts in Bank 5, Location 1400 and is applicable to both DSKY's. The sequence of program functions are performed in the order listed below.

a. Clears all DSKY Indicators and Display Registers.

b. Lights DSKY Indicators one at a time in the order listed below:

1. UPLINK
2. NO ATT
3. KEY REL (Flashing)
4. TEMP
5. GIMBAL LOCK
6. PROG
7. TRACKER
8. OPR ERR (Flashing)

c. Lights DSKY Indicators RESTART and STBY together.

d. Lights entire panel with KEY REL and OPR ERR flashing.

e. Turns on DSKY COMP ACTY indicator. (This indicator will remain on for the DSKY Register test.

f. Writes +00000 into DSKY Registers 1, 2, and 3 and flashes 00 in the VERB and NOUN displays.

g. Writes -11111 into DSKY Registers 1, 2, and 3 and flashes 11 in the VERB and NOUN displays.

h. Writes +22222 into DSKY Registers 1, 2, and 3 and flashes 22 in the VERB and NOUN displays.

i. Writes -33333 into DSKY Registers 1, 2, and 3 and flashes 33 in the VERB and NOUN displays.

j. Writes +44444 into DSKY Registers 1, 2, and 3 and flashes 44 in the VERB and NOUN displays.

k. Writes -55555 into DSKY Registers 1, 2, and 3 and flashes 55 in the VERB and NOUN displays.

l. Writes +66666 into DSKY Registers 1, 2, and 3 and flashes 66 in the VERB and NOUN displays.

m. Writes -77777 into DSKY Registers 1, 2, and 3 and flashes 77 in the VERB and NOUN displays.

n. Writes +88888 into DSKY Registers 1, 2, and 3 and flashes 88 in the VERB and NOUN displays.

o. Writes -99999 into DSKY Registers 1, 2, and 3 and flashes 99 in the VERB and NOUN displays.

p. Displays 70707 alternating with 07070 on the REG SEL display (with register select switch set to L). This display will be presented for 15 seconds, after which time the entire test will automatically repeat. The T12 COUNTER STOP switch should be set to the ON position during this display, so that all DSKY displays will be in the clear condition at the conclusion of testing. Success or failure of this test is determined visually by the operator noting that all displays occur as specified.

196. Transfer Control to E Bank 5, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

197. Press the MONITOR indicator switch to the on (illuminated) position and set the register select switch to the L position.

198. Press the CL Key.

199. Set the T12 COUNTER STOP switch to the OFF position.

200. Set the INHIBIT INCREMENTS switch to the OFF position.

201. Press the PROCEED button.

202. Verify that the DSKY UPLINK ACTY indicator turns on.

203. Verify that DSKY indicator:
UPLINK ACTY turns off
NO ATT turns on

204. Verify that DSKY indicator:
NO ATT turns off
KEY REL turns on and is flashing

205. Verify that DSKY indicator:
KEY REL turns off
TEMP turns on

206. Verify that DSKY indicator:
TEMP turns off
GIMBAL LOCK turns on

207. Verify that DSKY indicator:
GIMBAL LOCK turns off
PROG turns on

208. Verify that DSKY indicator:
PROG turns off
TRACKER turns on

209. Verify that TRACKER indicator turns off

210. Verify that DSKY OPR ERR indicator turns on and is flashing

211. Verify that DSKY indicator:
OPR ERR turns off
RESTART and STBY turn on together

212. Verify that all of the DSKY indicators mentioned above, are on with the KEY REL and OPR ERR indicators flashing:

213. Verify that the DSKY COMP ACTY indicator turns on. This indicator should remain on for the rest of the test.

214. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +00000
Register 2 = +00000
Register 3 = +00000
VERB = 00 (Flashing)
NOUN = 00 (Flashing)

215. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -11111
Register 2 = -11111
Register 3 = -11111
VERB = 11 (Flashing)
NOUN = 11 (Flashing)

216. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +22222
Register 2 = +22222
Register 3 = +22222
VERB = 22 (Flashing)
NOUN = 22 (Flashing)

217. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -33333
Register 2 = -33333
Register 3 = -33333
VERB = 33 (Flashing)
NOUN = 33 (Flashing)

218. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +44444
Register 2 = +44444
Register 3 = +44444
VERB = 44 (Flashing)
NOUN = 44 (Flashing)

219. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -55555
Register 2 = -55555
Register 3 = -55555
VERB = 55 (Flashing)
NOUN = 55 (Flashing)

220. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +66666
Register 2 = +66666
Register 3 = +66666
VERB = 66 (Flashing)
NOUN = 66 (Flashing)

221. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -77777
Register 2 = -77777
Register 3 = -77777
VERB = 77 (Flashing)
NOUN = 77 (Flashing)

222. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +88888
Register 2 = +88888
Register 3 = +88888
VERB = 88 (Flashing)
NOUN = 88 (Flashing)

223. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -99999
Register 2 = -99999
Register 3 = -99999
VERB = 99 (Flashing)
NOUN = 99 (Flashing)

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST | **JDC** 05783 **REV** C **PAGE** 17 **OF** 17

SUBSYSTEM Computer | **ASSY** Block II - C Computer

224. Verify that the DSKY display is clear, and the REG SEL display is 70707 alternating with 07070. Set the T12 COUNTER STOP switch to the ON position immediately after verifying the REG SEL display. If a failure was observed during this test, do not turn ON the T12 COUNTER STOP switch. Allow the test program to recycle twice, and if the malfunction is still present, discontinue further testing. Stop the computer coincident with the REG SEL display, as described above.

225. Set the INHIBIT INCREMENT switch to the ON position.

226. Press the FRESH START button. Verify RESTART alarm indicator on DSKY turns on. Stamp data sheet if test was successful.

227. Proceed to the CSS Power Turn-off section of JDC 05420. (See Figure 1 of JDC 05770.)

DATE 26 JAN 67

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

NO. 05783 JDC
REV. C
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
136.	Channels 30, 31, and 32 test (steps 7 through 136) completed successfully.		
195.	DSKY Spacecraft Signals (steps 139 through 195) completed successfully.		
→ 226.	DSKY Display test (steps 196 through 225) completed successfully.		

DATE 26 JAN 67

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-ALLEREST
JDC 05783 REV. D PAGE 1 OF 17
INITIAL TDRR 32809 D.S. PGS 1
SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

Program ALLEREST contains three separate tests, the first of which tests the operation of Channels 30, 31, and 32. The next test checks the operation of the DSKY relays used to transmit signals to the spacecraft. The last test checks the operation of the DSKY Indicators and Display Registers. It is recommended that the Program Analysis sections of this JDC be reviewed prior to testing.

Rev Let	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-7-67	34517	4, 10, 12-17	All	EA	-
B	11-16-67	35057	3-10, 12, 15	-	EA	-
C	3-22-68	35899	1, 12, 17	-	EA	-
D	10-17-68	36907	1, 3, 11, 14, 16, 17	-	EA	-

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program ALLEREST
Mylar Tape, JDC 05784

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414. Depress LAMP TEST pushbutton on the Self Test panel and verify all indicators on the XY Interface panel illuminate.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the RDC Interface panel of the CTS.

3. Load PROGRAM ALLEREST (JDC 05784) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407, Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

PROGRAM ANALYSIS - CHANNELS 30, 31, AND 32

The programmed functions of this portion of the test checks that 30, 31, and 32 receive DC signals in the proper bit positions via the interface module. Initially, the program verifies that

VERIFICATION WITH SIDL REQUIRED BEFORE USE

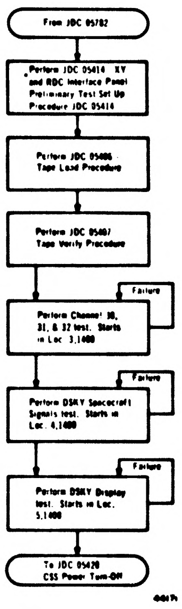
From JDC 05782
Perform JDC 05414 XY and RDC Interface Panel Preliminary Test Set Up Procedure JDC 05414
Perform JDC 05406 Tape Load Procedure
Perform JDC 05407 Tape Verify Procedure
Failure
Perform Channel 30, 31, & 32 test. Starts in Loc 3,1400
Failure
Perform DSKY Spacecraft Signals test. Starts in Loc. 4,1400
Failure
Perform DSKY Display test. Starts in Loc. 5,1400
To JDC 05420 CSS Power Turn-Off

Figure 1. Flowchart for Performing Program ALLEREST

all the bit positions of channels 30, 31 and 32 are de-energized. The program will:

(1) Turn on the COMPUTER ACTIVITY light;
(2) Blank the DSKY (PROGRAM, VERB, R1, R2, R3, PROGRAM ALARM, GIMBAL LOCK, TRACKER, NO ATTITUDE);
(3) Check to see that all the bit positions of channels 30, 31, and 32 are de-energized;
(4) and, if all bits are de-energized, turn off the COMPUTER ACTIVITY light.

Extinguishing of the COMPUTER ACTIVITY light signals the operator to start the switching sequence at the RDC interface panel, beginning with channel 30, bit 1 - ending with channel 32, bit 10.

At this point and throughout the remainder of the switching sequence the program looks for a switch to be energized. When the program detects an actuation it enters a routine to determine that it was the proper switch, and checks the other two channels to make sure that they do not have bits present. If no discrepancies are noted during these checks, the computer will turn on the DSKY COMPUTER ACTIVITY light and register A will present a five second flashing display - all bits will flash except the one under test. At the end of this period the program will turn off the DSKY COMPUTER ACTIVITY light and register A goes back to normal program monitoring. Extinguishing of the COMPUTER ACTIVITY light signals the operator to de-energize the switch/bit just tested and energize the next switch/bit position.

When one channel has been completely tested, the test is continued by actuating switch/bit number one of the next channel. The last switch/bit energized in the sequence is channel 32, bit 10. The program will:

(1) Wait for the switch to be energized;
(2) Check the 60 second time limit;
(3) Check that the proper bit was energized;
(4) Check that bits in the other two channels are de-energized;
(5) Turn on the COMPUTER ACTIVITY light;
(6) Cause Register A to present a five second flashing display - all bits will flash except the one under test;
(7) Return Register A back to normal program monitoring;
(8) Turn off the COMPUTER ACTIVITY light;
(9) Check to see if the previous button is still on;
(10) Check the 60 second time limit, and
(11) Keeps checking to see if previous button is still on. When it is de-energized, the program will check for the next button to be energized, and it also keeps track of the 60 second time limit since the COMPUTER ACTIVITY light was turned off.
(12) When next button is energized, start with step (3) again until all bits in Channel 30, 31 and 32 are tested.

After Channel 32 bit 10 is tested, the program will switch to the success routine which will be displayed on Register L as 70707 alternating with 07070.

The DSKY indications used in this test and their interpretation are listed below:

NO ATTITUDE:	Operator failed to energize the next test bit within one minute of completion of testing of last bit. Will notify operator of an energized bit not received by the computer (Register A will also not give 5 second display).

KEY RELEASE:	Two adjacent switches are energized together for 30 seconds. This situation occurs when the operator energizes the switch to be tested before he de-energized the previous switch which was just checked.
OPERATOR ERROR:	Hardware failure. Detection of an improper bit being energized in channel being tested. Detection of a bit in another channel being energized when correct bit in channel being tested is energized. Detection of a bit energized out of sequence in channel being tested.
	Detection of an improper bit in Channel 30, 31 and 32 will be displayed on the DSKY as follows: Verb - channel where error was detected. Register 1 - Octal display of Channel 30. Register 2 - Octal display of Channel 31. Register 3 - Octal display of Channel 32.
PROGRAM ALARM:	Program Failure. Check contents of Register Q for location of program failure generation.

If any error condition occurs the operator transfers control back to location 3, 1400 and reruns the test again. If the error resulted from improper operation of the hardware under test, and a second error occurs, discontinue further testing.

7. Transfer Control to E Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

8. Press the MONITOR indicator switch to the on (illuminated) position.

9. Press the CL Key.

10. Set the T12 COUNTER STOP switch to the OFF position.

11. Set the INHIBIT INCREMENTS switch to the OFF position.

12. Press the PROCEED button.

13. Verify that the DSKY COMP ACTY indicator switches off.

NOTE: CH30, 31, and 32 are alternate-action indicator switches which are illuminated in the energized position. To turn on any switch press to the illuminated position. To turn off any switch press to the extinguished position.

14. If an error condition occurs in any part of this test, perform steps 137 and 138.

15. Press CH30-1/IN0-1 to the on (illuminated) position.

16. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

17. Press CH30-1/IN0-1 to the off position.

18. Press CH30-2/IN0-2 to the on position.

19. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

20. Press CH30-2/IN0-2 to the off position.

21. Press CH30-3/IN0-3 to the on position.

22. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

23. Press CH30-3/IN0-3 to the off position.

24. Press CH30-4/IN0-4 to the on position.

25. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

26. Press CH30-4/IN0-4 to the off position.

27. Press CH30-5/IN0-5 to the on position.

28. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

29. Press CH30-5/IN0-5 to the off position.

30. Press CH30-6/IN0-6 to the on position.

31. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

32. Press CH30-6/IN0-6 to the off position.

33. Press CH30-7/IN0-7 to the on position.

34. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

35. Press CH30-7/IN0-7 to the off position.

36. Press CH30-8/IN0-8 to the on position.

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37. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

38. Press CH30-8/IN0-8 to the off position.

39. Press CH30-9/IN0-9 to the on position.

40. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

41. Press CH30-9/IN0-9 to the off position.

42. Press CH30-10/IN0-10 to the on position.

43. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

44. Press CH30-10/IN0-10 to the off position.

45. Press CH30-11/IN0-11 to the on position.

46. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

47. Press CH30-11/IN0-11 to the off position.

48. Press CH30-12/IN0-12 to the on position.

49. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

50. Press CH30-12/IN0-12 to the off position.

51. Press CH30-13/IN0-13 to the on position.

52. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

53. Press CH30-13/IN0-13 to the off position.

54. Press CH30-14/IN0-14 to the on position.

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55. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

56. Press CH30-14/IN0-14 to the off position.

57. Press CH30-15/IN0-15 to the on position.

58. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

59. Press CH30-15/IN0-15 to the off position.

60. Press CH31-1/IN2-1 to the on position.

61. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

62. Press CH31-1/IN2-1 to the off position.

63. Press CH31-2/IN2-2 to the on position.

64. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

65. Press CH31-2/IN2-2 to the off position.

66. Press CH31-3/IN2-3 to the on position.

67. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

68. Press CH31-3/IN2-3 to the off position.

69. Press CH31-4/IN2-4 to the on position.

70. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

71. Press CH31-4/IN2-4 to the off position.

72. Press CH31-5/IN2-5 to the on position.

73. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

74. Press CH31-5/IN2-5 to the off position.

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75. Press CH31-6/IN2-6 to the on position.

76. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

77. Press CH31-6/IN2-6 to the off position.

78. Press CH31-7/IN2-7 to the on position.

79. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

80. Press CH31-7/IN2-7 to the off position.

81. Press CH31-8/IN2-8 to the on position.

82. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

83. Press CH31-8/IN2-8 to the off position.

84. Press CH31-9/IN2-9 to the on position.

85. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

86. Press CH31-9/IN2-9 to the off position.

87. Press CH31-10/IN2-10 to the on position.

88. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

89. Press CH31-10/IN2-10 to the off position.

90. Press CH31-11/IN2-11 to the on position.

91. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

92. Press CH31-11/IN2-11 to the off position.

93. Press CH31-12/IN2-12 to the on position.

94. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

95. Press CH31-12/IN2-12 to the off position.

96. Press CH31-13/IN2-13 to the on position.

97. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

98. Press CH31-13/IN2-13 to the off position.

99. Press CH31-14/IN2-14 to the on position.

100. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

101. Press CH31-14/IN2-14 to the off position.

102. Press CH31-15/IN2-15 to the on position.

103. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

104. Press CH31-15/IN2-15 to the off position.

105. Press CH32-1/IN3-1 to the on position.

106. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

107. Press CH32-1/IN3-1 to the off position.

108. Press CH32-2/IN3-2 to the on position.

109. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

110. Press CH32-2/IN3-2 to the off position.

111. Press CH32-3/IN3-3 to the on position.

112. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

113. Press CH32-3/IN3-3 to the off position.

114. Press CH32-4/IN3-4 to the on position.

115. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

116. Press CH32-4/IN3-4 to the off position.

117. Press CH32-5/IN3-5 to the on position.

118. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

119. Press CH32-5/IN3-5 to the off position.

120. Press CH32-6/IN3-6 to the on position.

121. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

122. Press CH32-6/IN3-6 to the off position.

123. Press CH32-7/IN3-7 to the on position.

124. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

125. Press CH32-7/IN3-7 to the off position.

126. Press CH32-8/IN3-8 to the on position.

127. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

128. Press CH32-8/IN3-8 to the off position.

129. Press CH32-9/IN3-9 to the on position.

130. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

131. Press CH32-9/IN3-9 to the off position.

132. Press CH32-10/IN3-10 to the on position.

133. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

134. Press CH32-10/IN3-10 to the off position.

135. Set the register select switch to the L position.

136. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this section of the test has been successfully completed. Stamp data sheet and proceed to step 139 of this JDC.

137. Set the T12 COUNTER STOP switch to the on position.

138. Starting with step 7, perform the procedures of this JDC again. If the failure occurs again discontinue further testing.

PROGRAM ANALYSIS - DSKY SPACECRAFT SIGNALS

This program exercises the DSKY Relays which transmit discrete signals to the spacecraft. This section of the ALLEREST program is composed of 12 test exercises which activate certain DSKY Relays in turn producing a visual indication on the MAIN and NAV DSKY sections of the CTS Interface panel. Tests are performed incrementally with the program pausing at the conclusion of each test to signal the operator with the COMP ACTY light that it is waiting to perform the next test. The operator allows the next test to be performed by pressing Bit 1 of Channel 30 (RDC Interface) twice. Bit 1 of Channel 30 is an alternate action switch which is off initially. On the first actuation Bit 1 is turned on allowing the program to extinguish COMP ACTY. Then the program waits for the next (off) actuation of Bit 1. When Bit 1 is switched off the program will perform the next test. The first set of procedures described under 1 below are concerned with initialization procedures.

1. Program Initialization Routine

a. Turns on DSKY RESTART (Bit 10, Channel 11) light.

b. Switches to ALRMOFF (Location 1465) which in sequence performs the following:

1. Load 60000 into Channel 10, turning off DSKY indicators PROGRAM, TRACKER, GIMBAL LOCK, NO ATT, and, in those systems which contain the lights, FREE, HOLD, and AUTO.

2. Stores return address (Q) in 0112.

3. Writes PZ (positive zero) into Channels 12, 13, and 33.

4. Reads and Masks Bit 14 of Channel 33 (WARNING light).

5. Tests bit 14 for the off condition. If it is on, the program will turn on the OPERATOR ERROR light (Channel 11, Bit 7) to indicate to the operator that the AGC WARNING is set. The program will then go back and read Channel 33 again and check for bit 14 for the off condition. If the AGC WARNING is off, the program will load PZ into Channel 11 and continue the program.

6. Switches back to the return address as stored in 0112.

c. Loads PZ into the Index location (TESEL).

d. Switches out to COMPON (location 1515) where it writes 00002 into Channel 11 turning on the COMP ACTY light.

The COMPON and ALRM OFF subroutines are used as integral portions of the test routine described below. The program procedures described under 2 are valid for any test being performed in this section with the only difference being the end result, i.e., the actual indicators illuminated on the DSKY and on the XY Interface panel of the CTS.

2. Program Testing Routine

a. Turn on COMP ACTY. Read Channel 30 and Mask with Bit one and test results with a CCS.

b. If the operator has not pushed the button the program stays in a loop which continues to RDCH30 and test for the anticipated switch actuation.

c. When the switch (Bit 1 CH30) is actuated the program switches to the ALRM OFF subroutine resetting the COMP ACTY light and again checks for AGC WARNING (Channel 33, Bit 14) off condition.

d. The program then switches back to the main program and the next instruction is another RDCH30. Channel 30 is read and Masked with bit one and tested with another CCS instruction (at 1414), but this time the test is for a POSITIVE NON-ZERO accumulator, indicating that the operator has de-energized Bit of CH30.

e. The CCS instruction above switches the program to an Index (location 1542) instruction. The Index location (TESEL) in combination with the TC (to 1525) to the test table (TSTAB) instruction provides a switch which selects the next test (in sequence) from the table.

f. TSTAB will switch the program into the proper test subroutine which will set up the DSKY Relay word to illuminate the specified indicators.

g. After the indicators have been turned on the program will increment TESEL (Index) so that the next location in the test table will be selected after the operator repeats the on-off switching sequence of Bit 1 Channel 30. The program will loop back to (a) above and repeat (a) through (g) for the next test sequence.

There is no success display provided at the end of this particular section of the ALLEREST. The test will be completed successfully if all of the indicators and alarms specified in the steps below illuminate and extinguish in accordance with the procedure.

139. Set the T12 COUNTER STOP switch to the ON position.

140. Transfer Control to E Bank 4, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

141. Press RDC Interface switch CH30-15/IN0-15 to the on (illuminated) position. Verify TEMP alarm indicator on DSKY turns off.

142. Press the MONITOR indicator switch to the on (illuminated) position.

143. Press the CL Key.

144. Set switches INHIBIT INCREMENTS and T12 COUNTER STOP to the OFF position.

145. Press the PROCEED button, then the ALARM RESET button.

146. When the COMP ACT light (after a delay of approximately 10 seconds) appears on either DSKY, verify the following:

a. All lights are OFF in the MAIN DSKY section of the XY Interface Panel.

b. All lights are OFF in the NAV DSKY section of the XY Interface Panel.

c. All alarm lights on the DSKY are OFF.

NOTE: RDC Interface switch CH30-1 is an alternate action indicator switch which is illuminated in the on state and extinguished in the off state. When performing any steps which require CH30-1 to be turned on and off, allow an approximate 3 second delay between switch actuations. Omit NAV DSKY callouts in the following steps if this procedure is being performed during LM CSS checkout.

147. Press the CH30-1 on and then off.

148. On either DSKY verify that the COMP ACTY light is ON.

149. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M37, M42, N25, and N30.

150. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

151. Press CH30-1 OFF.

152. On either DSKY verify that the COMP ACTY light is on.

153. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M34 and N20.

154. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

155. Press CH30-1 OFF.

156. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M36 and N19.

157. On either DSKY verify that the COMP ACTY light is ON.

158. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

159. Press CH30-1 OFF.

160. On either DSKY verify that the COMP ACTY light is ON.

161. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M41 and N29.

162. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

163. Press CH30-1 OFF.

164. On either DSKY verify that the COMP ACTY and GIMBAL LOCK lights are ON.

165. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

166. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

167. Press CH30-1 OFF.

168. On either DSKY verify that the COMP ACTY light is ON.

169. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M31 and N21.

170. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

171. Press CH30-1 OFF.

172. On either DSKY verify that the COMP ACTY and TRACKER lights are ON.

173. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

174. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

175. Press CH30-1 OFF.

176. On either DSKY verify that the COMP ACTY and PROGRAM lights are ON.

177. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

178. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

179. Press CH30-1 OFF.

180. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

181. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

182. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

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183. Press CH30-15 and CH30-1 OFF.

184. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

185. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

186. Press CH30-15 and CH30-1 ON and verify that the lights of the two preceding steps go OFF.

187. Press CH30-1 OFF.

188. On either DSKY verify that the COMP ACTY, STBY and RESTART lights are ON.

189. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M32, M38, M39 and M40 N22, N26, N27 and N28.

190. Press CH30-1 ON.

191. Press ALARM RESET.

192. When the COMP ACTY light goes OFF, verify that all lights on the DSKY section of the XY Interface Panel are OFF.

193. Press CH30-1 OFF.

194. Set T12 and INHIBIT INCREMENT switches ON.

195. Stamp data sheet if the test was successfully completed. If a failure occurred during this test repeat all steps starting with step 140. If a second failure occurs, discontinue further testing.

PROGRAM ANALYSIS - DSKY DISPLAY

The DSKY Test is a fully automatic test routine which starts in Bank 5, Location 1400 and is applicable to both DSKY's. The sequence of program functions are performed in the order listed below.

a. Clears all DSKY Indicators and Display Registers.

b. Lights DSKY Indicators one at a time in the order listed below:

1.	UPLINK	5.	GIMBAL LOCK
2.	NO ATT	6.	PROG
3.	KEY REL (Flashing)	7.	TRACKER
4.	TEMP	8.	OPR ERR (Flashing)

c. Lights DSKY Indicators RESTART and STBY together.

d. Lights entire panel with KEY REL and OPR ERR flashing.

e. Turns on DSKY COMP ACTY indicator. (This indicator will remain on for the DSKY Register test.)

f. Writes +00000 into DSKY Registers 1, 2, and 3 and flashes 00 in the VERB and NOUN displays and non-flashing 00 in the PROGRAM display.

g. Writes -11111 into DSKY Registers 1, 2, and 3 and flashes 11 in the VERB and NOUN displays and non-flashing 11 in the PROGRAM display.

h. Writes +22222 into DSKY Registers 1, 2, and 3 and flashes 22 in the VERB and NOUN displays and non-flashing 22 in the PROGRAM display.

i. Writes -33333 into DSKY Registers 1, 2, and 3 and flashes 33 in the VERB and NOUN displays and non-flashing 33 in the PROGRAM display.

j. Writes +44444 into DSKY Registers 1, 2, and 3 and flashes 44 in the VERB and NOUN displays and non-flashing 44 in the PROGRAM display.

---

k. Writes -55555 into DSKY Registers 1, 2, and 3 and flashes 55 in the VERB and NOUN displays and non-flashing 55 in the PROGRAM display.

l. Writes +66666 into DSKY Registers 1, 2, and 3 and flashes 66 in the VERB and NOUN displays and non-flashing 66 in the PROGRAM display.

m. Writes -77777 into DSKY Registers 1, 2, and 3 and flashes 77 in the VERB and NOUN displays and non-flashing 77 in the PROGRAM display.

n. Writes +88888 into DSKY Registers 1, 2, and 3 and flashes 88 in the VERB and NOUN displays and non-flashing 88 in the PROGRAM display.

o. Writes -99999 into DSKY Registers 1, 2, and 3 and flashes 99 in the VERB and NOUN displays and non-flashing 99 in the PROGRAM display.

p. Displays 70707 alternating with 07070 on the REG SEL display (with register select switch set to L). This display will be presented for 15 seconds, after which time the entire test will automatically repeat. The T12 COUNTER STOP switch should be set to the ON position during this display, so that all DSKY displays will be in the clear condition at the conclusion of testing. Success or failure of this test is determined visually by the operator noting that all displays occur as specified.

196. Transfer Control to E Bank 5, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

197. Press the MONITOR indicator switch to the on (illuminated) position and set the register select switch to the L position.

198. Press the CL Key.

199. Set the T12 COUNTER STOP switch to the OFF position.

200. Set the INHIBIT INCREMENTS switch to the OFF position.

201. Press the PROCEED button.

202. Verify that the DSKY UPLINK ACTY indicator turns on.

203. Verify that DSKY indicator:
UPLINK ACTY turns off
NO ATT turns on

204. Verify that DSKY indicator:
NO ATT turns off
KEY REL turns on and is flashing

205. Verify that DSKY indicator:
KEY REL turns off
TEMP turns on

206. Verify that DSKY indicator:
TEMP turns off
GIMBAL LOCK turns on

207. Verify that DSKY indicator:
GIMBAL LOCK turns off
PROG turns on

208. Verify that DSKY indicator:
PROG turns off
TRACKER turns on

209. Verify that TRACKER indicator turns off

210. Verify that DSKY
OPR ERR indicator turns on and is flashing

211. Verify that DSKY indicator:
OPR ERR turns off
RESTART and STBY turn on together

212. Verify that all of the DSKY indicators mentioned above, are on with the KEY REL and OPR ERR indicators flashing:

---

213. Verify that the DSKY COMP ACTY indicator turns on. This indicator should remain on for the rest of the test.

214. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +00000
Register 2 = +00000
Register 3 = +00000
VERB = 00 (Flashing)
NOUN = 00 (Flashing)
PROGRAM = 00

215. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -11111
Register 2 = -11111
Register 3 = -11111
VERB = 11 (Flashing)
NOUN = 11 (Flashing)
PROGRAM = 11

216. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +22222
Register 2 = +22222
Register 3 = +22222
VERB = 22 (Flashing)
NOUN = 22 (Flashing)
PROGRAM = 22

217. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -33333
Register 2 = -33333
Register 3 = -33333
VERB = 33 (Flashing)
NOUN = 33 (Flashing)
PROGRAM = 33

218. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +44444
Register 2 = +44444
Register 3 = +44444
VERB = 44 (Flashing)
NOUN = 44 (Flashing)
PROGRAM = 44

219. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -55555
Register 2 = -55555
Register 3 = -55555
VERB = 55 (Flashing)
NOUN = 55 (Flashing)
PROGRAM = 55

220. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +66666
Register 2 = +66666
Register 3 = +66666
VERB = 66 (Flashing)
NOUN = 66 (Flashing)
PROGRAM = 66

221. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -77777
Register 2 = -77777
Register 3 = -77777
VERB = 77 (Flashing)
NOUN = 77 (Flashing)
PROGRAM = 77

222. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +88888
Register 2 = +88888
Register 3 = +88888
VERB = 88 (Flashing)
NOUN = 88 (Flashing)
PROGRAM = 88

223. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -99999
Register 2 = -99999
Register 3 = -99999
VERB = 99 (Flashing)
NOUN = 99 (Flashing)
PROGRAM = 99

224. Verify that the DSKY display is clear, and the REG SEL display is 70707 alternating with 07070. Set the T12 COUNTER STOP switch to the ON position immediately after verifying the REG SEL display. If a failure was observed during this test, do not turn ON the T12 COUNTER STOP switch. Allow the test program to recycle twice, and if the malfunction is still present, discontinue further testing. Stop the computer coincident with the REG SEL display, as described above.

225. Set the INHIBIT INCREMENT switch to the ON position.

226. Press the FRESH START button. Verify RESTART alarm indicator on DSKY turns on. Stamp data sheet if test was successful.

227. Deleted.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05783 JDC
REV. D
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

ASSEMBLY UNDER TEST
TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY
DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
136.	Channels 30, 31, and 32 test (steps 7 through 136) completed successfully.		
195.	DSKY Spacecraft Signals (steps 139 through 195) completed successfully.		
226.	DSKY Display test (steps 196 through 225) completed successfully.		

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-ALLEREST

JDC 05783 **REV.** E **PAGE** 1 **OF** 17
INITIAL TDRR 32809 **D.S. PGS** 1

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

Program ALLEREST contains three separate tests, the first of which tests the operation of Channels 30, 31, and 32. The next test checks the operation of the DSKY relays used to transmit signals to the spacecraft. The last test checks the operation of the DSKY Indicators and Display Registers. It is recommended that the Program Analysis sections of this JDC be reviewed prior to testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-7-67	34517	4, 10, 12-17	All	EA	-
B	11-16-67	35057	3-10, 12, 15	-	EA	-
C	3-22-68	35899	1, 12, 17	-	EA	-
D	10-17-68	36907	1, 3, 11, 14, 16, 17	-	EA	-
E	1-20-69	37204	11	-	EA	-

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program ALLEREST Mylar Tape, JDC 05784

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414. Depress LAMP TEST pushbutton on the Self Test panel and verify all indicators on the XY Interface panel illuminate.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the RDC Interface panel of the CTS.

3. Load PROGRAM ALLEREST (JDC 05784) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407, Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

PROGRAM ANALYSIS - CHANNELS 30, 31, AND 32

The programmed functions of this portion of the test checks that 30, 31, and 32 receive DC signals in the proper bit positions via the interface module. Initially, the program verifies that

VERIFICATION WITH SIOL REQUIRED BEFORE USE

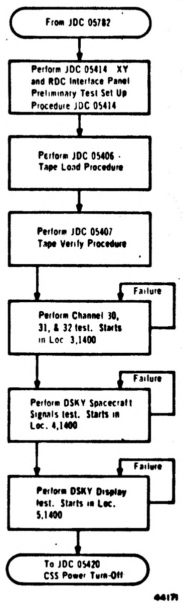
From JDC 05782
Perform JDC 05414 XY and RDC Interface Panel Preliminary Test Set Up Procedure JDC 05414
Perform JDC 05406 Tape Load Procedure
Perform JDC 05407 Tape Verify Procedure
Failure
Perform Channel 30, 31, & 32 test. Starts in Loc 3,1400
Failure
Perform DSKY Spacecraft Signals test. Starts in Loc. 4,1400
Failure
Perform DSKY Display test. Starts in Loc. 5,1400
To JDC 05420 CSS Power Turn-Off
44171

Figure 1. Flowchart for Performing Program ALLEREST

all the bit positions of channels 30, 31 and 32 are de-energized. The program will:

(1) Turn on the COMPUTER ACTIVITY light;
(2) Blank the DSKY (PROGRAM, VERB, R1, R2, R3, PROGRAM ALARM, GIMBAL LOCK, TRACKER, NO ATTITUDE);
(3) Check to see that all the bit positions of channels 30, 31, and 32 are de-energized;
(4) and, if all bits are de-energized, turn off the COMPUTER ACTIVITY light.

Extinguishing of the COMPUTER ACTIVITY light signals the operator to start the switching sequence at the RDC interface panel, beginning with channel 30, bit 1 - ending with channel 32, bit 10.

At this point and throughout the remainder of the switching sequence the program looks for a switch to be energized. When the program detects an actuation it enters a routine to determine that it was the proper switch, and checks the other two channels to make sure that they do not have bits present. If no discrepancies are noted during these checks, the computer will turn on the DSKY COMPUTER ACTIVITY light and register A will present a five second flashing display - all bits will flash except the one under test. At the end of this period the program will turn off the DSKY COMPUTER ACTIVITY light and register A goes back to normal program monitoring. Extinguishing of the COMPUTER ACTIVITY light signals the operator to de-energize the switch/bit just tested and energize the next switch/bit position.

When one channel has been completely tested, the test is continued by actuating switch/bit number one of the next channel. The last switch/bit energized in the sequence is channel 32, bit 10. The program will:

(1) Wait for the switch to be energized;
(2) Check the 60 second time limit;
(3) Check that the proper bit was energized;
(4) Check that bits in the other two channels are de-energized;
(5) Turn on the COMPUTER ACTIVITY light;
(6) Cause Register A to present a five second flashing display - all bits will flash except the one under test;
(7) Return Register A back to normal program monitoring;
(8) Turn off the COMPUTER ACTIVITY light;
(9) Check to see if the previous button is still on;
(10) Check the 60 second time limit, and
(11) Keeps checking to see if previous button is still on. When it is de-energized, the program will check for the next button to be energized, and it also keeps track of the 60 second time limit since the COMPUTER ACTIVITY light was turned off.
(12) When next button is energized, start with step (3) again until all bits in Channel 30, 31 and 32 are tested.

After Channel 32 bit 10 is tested, the program will switch to the success routine which will be displayed on Register L as 70707 alternating with 07070.

The DSKY indications used in this test and their interpretation are listed below:

NO ATTITUDE:	Operator failed to energize the next test bit within one minute of completion of testing of last bit. Will notify operator of an energized bit not received by the computer (Register A will also not give 5 second display).

KEY RELEASE:	Two adjacent switches are energized together for 30 seconds. This situation occurs when the operator energizes the switch to be tested before he de-energized the previous switch which was just checked.
OPERATOR ERROR:	Hardware failure. Detection of an improper bit being energized in channel being tested. Detection of a bit in another channel being energized when correct bit in channel being tested is energized. Detection of a bit energized out of sequence in channel being tested.
	Detection of an improper bit in Channel 30, 31 and 32 will be displayed on the DSKY as follows: Verb - channel where error was detected. Register 1 - Octal display of Channel 30. Register 2 - Octal display of Channel 31. Register 3 - Octal display of Channel 32.
PROGRAM ALARM:	Program Failure. Check contents of Register Q for location of program failure generation.

If any error condition occurs the operator transfers control back to location 3, 1400 and reruns the test again. If the error resulted from improper operation of the hardware under test, and a second error occurs, discontinue further testing.

7. Transfer Control to E Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

8. Press the MONITOR indicator switch to the on (illuminated) position.

9. Press the CL Key.

10. Set the T12 COUNTER STOP switch to the OFF position.

11. Set the INHIBIT INCREMENTS switch to the OFF position.

12. Press the PROCEED button.

13. Verify that the DSKY COMP ACTY indicator switches off.

NOTE: CH30, 31, and 32 are alternate-action indicator switches which are illuminated in the energized position. To turn on any switch press to the illuminated position. To turn off any switch press to the extinguished position.

14. If an error condition occurs in any part of this test, perform steps 137 and 138.

15. Press CH30-1/IN0-1 to the on (illuminated) position.

16. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

17. Press CH30-1/IN0-1 to the off position.

18. Press CH30-2/IN0-2 to the on position.

19. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

20. Press CH30-2/IN0-2 to the off position.

21. Press CH30-3/IN0-3 to the on position.

22. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

23. Press CH30-3/IN0-3 to the off position.

24. Press CH30-4/IN0-4 to the on position.

25. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

26. Press CH30-4/IN0-4 to the off position.

27. Press CH30-5/IN0-5 to the on position.

28. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

29. Press CH30-5/IN0-5 to the off position.

30. Press CH30-6/IN0-6 to the on position.

31. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

32. Press CH30-6/IN0-6 to the off position.

33. Press CH30-7/IN0-7 to the on position.

34. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

35. Press CH30-7/IN0-7 to the off position.

36. Press CH30-8/IN0-8 to the on position.

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37. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

38. Press CH30-8/IN0-8 to the off position.

39. Press CH30-9/IN0-9 to the on position.

40. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

41. Press CH30-9/IN0-9 to the off position.

42. Press CH30-10/IN0-10 to the on position.

43. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

44. Press CH30-10/IN0-10 to the off position.

45. Press CH30-11/IN0-11 to the on position.

46. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

47. Press CH30-11/IN0-11 to the off position.

48. Press CH30-12/IN0-12 to the on position.

49. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

50. Press CH30-12/IN0-12 to the off position.

51. Press CH30-13/IN0-13 to the on position.

52. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

53. Press CH30-13/IN0-13 to the off position.

54. Press CH30-14/IN0-14 to the on position.

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55. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

56. Press CH30-14/IN0-14 to the off position.

57. Press CH30-15/IN0-15 to the on position.

58. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

59. Press CH30-15/IN0-15 to the off position.

60. Press CH31-1/IN2-1 to the on position.

61. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

62. Press CH31-1/IN2-1 to the off position.

63. Press CH31-2/IN2-2 to the on position.

64. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

65. Press CH31-2/IN2-2 to the off position.

66. Press CH31-3/IN2-3 to the on position.

67. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

68. Press CH31-3/IN2-3 to the off position.

69. Press CH31-4/IN2-4 to the on position.

70. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

71. Press CH31-4/IN2-4 to the off position.

72. Press CH31-5/IN2-5 to the on position.

73. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

74. Press CH31-5/IN2-5 to the off position.

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75. Press CH31-6/IN2-6 to the on position.

76. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

77. Press CH31-6/IN2-6 to the off position.

78. Press CH31-7/IN2-7 to the on position.

79. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

80. Press CH31-7/IN2-7 to the off position.

81. Press CH31-8/IN2-8 to the on position.

82. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

83. Press CH31-8/IN2-8 to the off position.

84. Press CH31-9/IN2-9 to the on position.

85. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

86. Press CH31-9/IN2-9 to the off position.

87. Press CH31-10/IN2-10 to the on position.

88. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

89. Press CH31-10/IN2-10 to the off position.

90. Press CH31-11/IN2-11 to the on position.

91. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

92. Press CH31-11/IN2-11 to the off position.

93. Press CH31-12/IN2-12 to the on position.

94. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

95. Press CH31-12/IN2-12 to the off position.

96. Press CH31-13/IN2-13 to the on position.

97. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

98. Press CH31-13/IN2-13 to the off position.

99. Press CH31-14/IN2-14 to the on position.

100. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

101. Press CH31-14/IN2-14 to the off position.

102. Press CH31-15/IN2-15 to the on position.

103. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

104. Press CH31-15/IN2-15 to the off position.

105. Press CH32-1/IN3-1 to the on position.

106. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

107. Press CH32-1/IN3-1 to the off position.

108. Press CH32-2/IN3-2 to the on position.

109. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

110. Press CH32-2/IN3-2 to the off position.

111. Press CH32-3/IN3-3 to the on position.

112. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

113. Press CH32-3/IN3-3 to the off position.

114. Press CH32-4/IN3-4 to the on position.

115. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

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b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

116. Press CH32-4/IN3-4 to the off position.

117. Press CH32-5/IN3-5 to the on position.

118. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

119. Press CH32-5/IN3-5 to the off position.

120. Press CH32-6/IN3-6 to the on position.

121. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

122. Press CH32-6/IN3-6 to the off position.

123. Press CH32-7/IN3-7 to the on position.

124. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

125. Press CH32-7/IN3-7 to the off position.

126. Press CH32-8/IN3-8 to the on position.

127. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

128. Press CH32-8/IN3-8 to the off position.

129. Press CH32-9/IN3-9 to the on position.

130. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

131. Press CH32-9/IN3-9 to the off position.

132. Press CH32-10/IN3-10 to the on position.

133. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

134. Press CH32-10/IN3-10 to the off position.

135. Set the register select switch to the L position.

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136. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this section of the test has been successfully completed. Stamp data sheet and proceed to step 139 of this JDC.

137. Set the T12 COUNTER STOP switch to the on position.

138. Starting with step 7, perform the procedures of this JDC again. If the failure occurs again discontinue further testing.

PROGRAM ANALYSIS - DSKY SPACECRAFT SIGNALS

This program exercises the DSKY Relays which transmit discrete signals to the spacecraft. This section of the ALLEREST program is composed of 12 test exercises which activate certain DSKY Relays in turn producing a visual indication on the MAIN and NAV DSKY sections of the CTS Interface panel. Tests are performed incrementally with the program pausing at the conclusion of each test to signal the operator with the COMP ACTY light that it is waiting to perform the next test. The operator allows the next test to be performed by pressing Bit 1 of Channel 30 (RDC Interface) twice. Bit 1 of Channel 30 is an alternate action switch which is off initially. On the first actuation Bit 1 is turned on allowing the program to extinguish COMP ACTY. Then the program waits for the next (off) actuation of Bit 1. When Bit 1 is switched off the program will perform the next test. The first set of procedures described under 1 below are concerned with initialization procedures.

1. Program Initialization Routine

a. Turns on DSKY RESTART (Bit 10, Channel 11) light.

b. Switches to ALRMOFF (Location 1465) which in sequence performs the following:

1. Load 60000 into Channel 10, turning off DSKY indicators PROGRAM, TRACKER, GIMBAL LOCK, NO ATT, and, in those systems which contain the lights, FREE (or VEL), HOLD (or SPARE), AUTO (or SPARE), and ALT.

2. Stores return address (Q) in 0112.

3. Writes PZ (positive zero) into Channels 12, 13, and 33.

4. Reads and Masks Bit 14 of Channel 33 (WARNING light).

5. Tests bit 14 for the off condition. If it is on, the program will turn on the OPERATOR ERROR light (Channel 11, Bit 7) to indicate to the operator that the AGC WARNING is set. The program will then go back and read Channel 33 again and check for bit 14 for the off condition. If the AGC WARNING is off, the program will load PZ into Channel 11 and continue the program.

6. Switches back to the return address as stored in 0112.

c. Loads PZ into the Index location (TESEL).

d. Switches out to COMPON (location 1515) where it writes 00002 into Channel 11 turning on the COMP ACTY light.

The COMPON and ALRM OFF subroutines are used as integral portions of the test routine described below. The program procedures described under 2 are valid for any test being performed in this section with the only difference being the end result, i.e., the actual indicators illuminated on the DSKY and on the XY Interface panel of the CTS.

2. Program Testing Routine

a. Turn on COMP ACTY. Read Channel 30 and Mask with Bit one and test results with a CCS.

---

b. If the operator has not pushed the button the program stays in a loop which continues to RDCH30 and test for the anticipated switch actuation.

c. When the switch (Bit 1 CH30) is actuated the program switches to the ALRM OFF subroutine resetting the COMP ACTY light and again checks for AGC WARNING (Channel 33, Bit 14) off condition.

d. The program then switches back to the main program and the next instruction is another RDCH30. Channel 30 is read and Masked with bit one and tested with another CCS instruction (at 1414), but this time the test is for a POSITIVE NON-ZERO accumulator, indicating that the operator has de-energized Bit of CH30.

e. The CCS instruction above switches the program to an Index (location 1542) instruction. The Index location (TESEL) in combination with the TC (to 1525) to the test table (TSTAB) instruction provides a switch which selects the next test (in sequence) from the table.

f. TSTAB will switch the program into the proper test subroutine which will set up the DSKY Relay word to illuminate the specified indicators.

g. After the indicators have been turned on the program will increment TESEL (Index) so that the next location in the test table will be selected after the operator repeats the on-off switching sequence of Bit 1 Channel 30. The program will loop back to (a) above and repeat (a) through (g) for the next test sequence.

There is no success display provided at the end of this particular section of the ALLEREST. The test will be completed successfully if all of the indicators and alarms specified in the steps below illuminate and extinguish in accordance with the procedure.

139. Set the T12 COUNTER STOP switch to the ON position.

140. Transfer Control to E Bank 4, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

141. Press RDC Interface switch CH30-15/IN0-15 to the on (illuminated) position. Verify TEMP alarm indicator on DSKY turns off.

142. Press the MONITOR indicator switch to the on (illuminated) position.

143. Press the CL Key.

144. Set switches INHIBIT INCREMENTS and T12 COUNTER STOP to the OFF position.

145. Press the PROCEED button, then the ALARM RESET button.

146. When the COMP ACT light (after a delay of approximately 10 seconds) appears on either DSKY, verify the following:

a. All lights are OFF in the MAIN DSKY section of the XY Interface Panel.

b. All lights are OFF in the NAV DSKY section of the XY Interface Panel.

c. All alarm lights on the DSKY are OFF.

NOTE: RDC Interface switch CH30-1 is an alternate action indicator switch which is illuminated in the on state and extinguished in the off state. When performing any steps which require CH30-1 to be turned on and off, allow an approximate 3 second delay between switch actuations. Omit NAV DSKY callouts in the following steps if this procedure is being performed during LM CSS checkout.

147. Press the CH30-1 on and then off.

148. On either DSKY verify that the COMP ACTY light is ON.

149. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M37, M42, N25, and N30.

150. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

151. Press CH30-1 OFF.

152. On either DSKY verify that the COMP ACTY light is on.

153. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M34 and N20.

154. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

155. Press CH30-1 OFF.

156. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M36 and N19.

157. On either DSKY verify that the COMP ACTY light is ON.

158. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

159. Press CH30-1 OFF.

160. On either DSKY verify that the COMP ACTY light is ON.

161. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M41 and N29.

162. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

163. Press CH30-1 OFF.

164. On either DSKY verify that the COMP ACTY and GIMBAL LOCK lights are ON.

165. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

166. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

167. Press CH30-1 OFF.

168. On either DSKY verify that the COMP ACTY light is ON.

169. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M31 and N21.

170. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

171. Press CH30-1 OFF.

172. On either DSKY verify that the COMP ACTY and TRACKER lights are ON.

173. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

174. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

175. Press CH30-1 OFF.

176. On either DSKY verify that the COMP ACTY and PROGRAM lights are ON.

177. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

178. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

179. Press CH30-1 OFF.

180. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

181. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

182. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

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183. Press CH30-15 and CH30-1 OFF.

184. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

185. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

186. Press CH30-15 and CH30-1 ON and verify that the lights of the two preceding steps go OFF.

187. Press CH30-1 OFF.

188. On either DSKY verify that the COMP ACTY, STBY and RESTART lights are ON.

189. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M32, M38, M39 and M40 N22, N26, N27 and N28.

190. Press CH30-1 ON.

191. Press ALARM RESET.

192. When the COMP ACTY light goes OFF, verify that all lights on the DSKY section of the XY Interface Panel are OFF.

193. Press CH30-1 OFF.

194. Set T12 and INHIBIT INCREMENT switches ON.

195. Stamp data sheet if the test was successfully completed. If a failure occurred during this test repeat all steps starting with step 140. If a second failure occurs, discontinue further testing.

PROGRAM ANALYSIS - DSKY DISPLAY

The DSKY Test is a fully automatic test routine which starts in Bank 5, Location 1400 and is applicable to both DSKY's. The sequence of program functions are performed in the order listed below.

a. Clears all DSKY Indicators and Display Registers.

b. Lights DSKY Indicators one at a time in the order listed below:

1.	UPLINK	5.	GIMBAL LOCK
2.	NO ATT	6.	PROG
3.	KEY REL (Flashing)	7.	TRACKER
4.	TEMP	8.	OPR ERR (Flashing)

c. Lights DSKY Indicators RESTART and STBY together.

d. Lights entire panel with KEY REL and OPR ERR flashing.

e. Turns on DSKY COMP ACTY indicator. (This indicator will remain on for the DSKY Register test.)

f. Writes +00000 into DSKY Registers 1, 2, and 3 and flashes 00 in the VERB and NOUN displays and non-flashing 00 in the PROGRAM display.

g. Writes -11111 into DSKY Registers 1, 2, and 3 and flashes 11 in the VERB and NOUN displays and non-flashing 11 in the PROGRAM display.

h. Writes +22222 into DSKY Registers 1, 2, and 3 and flashes 22 in the VERB and NOUN displays and non-flashing 22 in the PROGRAM display.

i. Writes -33333 into DSKY Registers 1, 2, and 3 and flashes 33 in the VERB and NOUN displays and non-flashing 33 in the PROGRAM display.

j. Writes +44444 into DSKY Registers 1, 2, and 3 and flashes 44 in the VERB and NOUN displays and non-flashing 44 in the PROGRAM display.

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k. Writes -55555 into DSKY Registers 1, 2, and 3 and flashes 55 in the VERB and NOUN displays and non-flashing 55 in the PROGRAM display.

l. Writes +66666 into DSKY Registers 1, 2, and 3 and flashes 66 in the VERB and NOUN displays and non-flashing 66 in the PROGRAM display.

m. Writes -77777 into DSKY Registers 1, 2, and 3 and flashes 77 in the VERB and NOUN displays and non-flashing 77 in the PROGRAM display.

n. Writes +88888 into DSKY Registers 1, 2, and 3 and flashes 88 in the VERB and NOUN displays and non-flashing 88 in the PROGRAM display.

o. Writes -99999 into DSKY Registers 1, 2, and 3 and flashes 99 in the VERB and NOUN displays and non-flashing 99 in the PROGRAM display.

p. Displays 70707 alternating with 07070 on the REG SEL display (with register select switch set to L). This display will be presented for 15 seconds, after which time the entire test will automatically repeat. The T12 COUNTER STOP switch should be set to the ON position during this display, so that all DSKY displays will be in the clear condition at the conclusion of testing. Success or failure of this test is determined visually by the operator noting that all displays occur as specified.

196. Transfer Control to E Bank 5, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

197. Press the MONITOR indicator switch to the on (illuminated) position and set the register select switch to the L position.

198. Press the CL Key.

199. Set the T12 COUNTER STOP switch to the OFF position.

200. Set the INHIBIT INCREMENTS switch to the OFF position.

201. Press the PROCEED button.

202. Verify that the DSKY UPLINK ACTY indicator turns on.

203. Verify that DSKY indicator:
UPLINK ACTY turns off
NO ATT turns on

204. Verify that DSKY indicator:
NO ATT turns off
KEY REL turns on and is flashing

205. Verify that DSKY indicator:
KEY REL turns off
TEMP turns on

206. Verify that DSKY indicator:
TEMP turns off
GIMBAL LOCK turns on

207. Verify that DSKY indicator:
GIMBAL LOCK turns off
PROG turns on

208. Verify that DSKY indicator:
PROG turns off
TRACKER turns on

209. Verify that TRACKER indicator turns off

210. Verify that DSKY OPR ERR indicator turns on and is flashing

211. Verify that DSKY indicator:
OPR ERR turns off
RESTART and STBY turn on together

212. Verify that all of the DSKY indicators mentioned above, are on with the KEY REL and OPR ERR indicators flashing.

---

213. Verify that the DSKY COMP ACTY indicator turns on. This indicator should remain on for the rest of the test.

214. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +00000
Register 2 = +00000
Register 3 = +00000
VERB = 00 (Flashing)
NOUN = 00 (Flashing)
PROGRAM = 00

215. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -11111
Register 2 = -11111
Register 3 = -11111
VERB = 11 (Flashing)
NOUN = 11 (Flashing)
PROGRAM = 11

216. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +22222
Register 2 = +22222
Register 3 = +22222
VERB = 22 (Flashing)
NOUN = 22 (Flashing)
PROGRAM = 22

217. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -33333
Register 2 = -33333
Register 3 = -33333
VERB = 33 (Flashing)
NOUN = 33 (Flashing)
PROGRAM = 33

218. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +44444
Register 2 = +44444
Register 3 = +44444
VERB = 44 (Flashing)
NOUN = 44 (Flashing)
PROGRAM = 44

219. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -55555
Register 2 = -55555
Register 3 = -55555
VERB = 55 (Flashing)
NOUN = 55 (Flashing)
PROGRAM = 55

220. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +66666
Register 2 = +66666
Register 3 = +66666
VERB = 66 (Flashing)
NOUN = 66 (Flashing)
PROGRAM = 66

221. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -77777
Register 2 = -77777
Register 3 = -77777
VERB = 77 (Flashing)
NOUN = 77 (Flashing)
PROGRAM = 77

222. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +88888
Register 2 = +88888
Register 3 = +88888
VERB = 88 (Flashing)
NOUN = 88 (Flashing)
PROGRAM = 88

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST | JDC 05783 REV E PAGE 17 OF 17

SUBSYSTEM Computer | ASSY Block II - C Computer

223. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -99999
Register 2 = -99999
Register 3 = -99999
VERB = 99 (Flashing)
NOUN = 99 (Flashing)
PROGRAM = 99

224. Verify that the DSKY display is clear, and the REG SEL display is 70707 alternating with 07070. Set the T12 COUNTER STOP switch to the ON position immediately after verifying the REG SEL display. If a failure was observed during this test, do not turn ON the T12 COUNTER STOP switch. Allow the test program to recycle twice, and if the malfunction is still present, discontinue further testing. Stop the computer coincident with the REG SEL display, as described above.

225. Set the INHIBIT INCREMENT switch to the ON position.

226. Press the FRESH START button. Verify RESTART alarm indicator on DSKY turns on. Stamp data sheet if test was successful.

227. Deleted.

DATE 26 JAN 67

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05783 JDC
REV. E
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
136.	Channels 30, 31, and 32 test (steps 7 through 136) completed successfully.		
195.	DSKY Spacecraft Signals (steps 139 through 195) completed successfully.		
→ 226.	DSKY Display test (steps 196 through 225) completed successfully.		

DATE 26 JAN 67

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST | JDC 05783 REV. F PAGE 1 OF 17 | INITIAL TDRR 32809 D.S. P35 1

SUBSYSTEM Computer | ASSY. Block II - C Computer

DESCRIPTION

Program ALLEREST contains three separate tests, the first of which tests the operation of Channels 30, 31, and 32. The next test checks the operation of the DSKY relays used to transmit signals to the spacecraft. The last test checks the operation of the DSKY Indicators and Display Registers. It is recommended that the Program Analysis sections of this JDC be reviewed prior to testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-7-67	34517	4, 10, 12-17	All	EA	-
B	11-16-67	35057	3-10, 12, 15	-	EA	-
C	3-22-68	35899	1, 12, 17	-	EA	-
D	10-17-68	36907	1, 3, 11, 14, 16, 17	-	EA	-
E	1-20-69	37204	11	-	EA	-
F	2-27-69	37374	1	-	EA	-

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program ALLEREST Mylar Tape, JDC 05784

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the RDC Interface panel of the CTS.

3. Load PROGRAM ALLEREST (JDC 05784) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407, Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

PROGRAM ANALYSIS - CHANNELS 30, 31, AND 32

The programmed functions of this portion of the test checks that 30, 31, and 32 receive DC signals in the proper bit positions via the interface module. Initially, the program verifies that

VERIFICATION WITH SIDL REQUIRED BEFORE USE

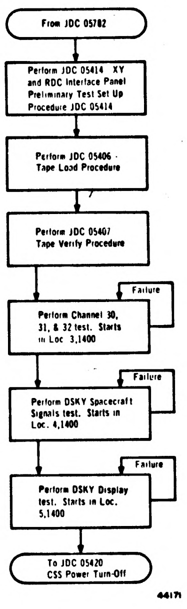
From JDC 05782
Perform JDC 05414 XY and RDC Interface Panel Preliminary Test Set Up Procedure JDC 05414
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 Tape Verify Procedure
Failure
Perform Channel 30, 31, & 32 test. Starts in Loc 3,1400
Failure
Perform DSKY Spacecraft Signals test. Starts in Loc. 4,1400
Failure
Perform DSKY Display test. Starts in Loc. 5,1400
To JDC 05420 CSS Power Turn-Off
44171

Figure 1. Flowchart for Performing Program ALLEREST

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all the bit positions of channels 30, 31 and 32 are de-energized. The program will:

(1) Turn on the COMPUTER ACTIVITY light;
(2) Blank the DSKY (PROGRAM, VERB, R1, R2, R3, PROGRAM ALARM, GIMBAL LOCK, TRACKER, NO ATTITUDE);
(3) Check to see that all the bit positions of channels 30, 31, and 32 are de-energized;
(4) and, if all bits are de-energized, turn off the COMPUTER ACTIVITY light.

Extinguishing of the COMPUTER ACTIVITY light signals the operator to start the switching sequence at the RDC interface panel, beginning with channel 30, bit 1 - ending with channel 32, bit 10.

At this point and throughout the remainder of the switching sequence the program looks for a switch to be energized. When the program detects an actuation it enters a routine to determine that it was the proper switch, and checks the other two channels to make sure that they do not have bits present. If no discrepancies are noted during these checks, the computer will turn on the DSKY COMPUTER ACTIVITY light and register A will present a five second flashing display - all bits will flash except the one under test. At the end of this period the program will turn off the DSKY COMPUTER ACTIVITY light and register A goes back to normal program monitoring. Extinguishing of the COMPUTER ACTIVITY light signals the operator to de-energize the switch/bit just tested and energize the next switch/bit position.

When one channel has been completely tested, the test is continued by actuating switch/bit number one of the next channel. The last switch/bit energized in the sequence is channel 32, bit 10. The program will:

(1) Wait for the switch to be energized;
(2) Check the 60 second time limit;
(3) Check that the proper bit was energized;
(4) Check that bits in the other two channels are de-energized;
(5) Turn on the COMPUTER ACTIVITY light;
(6) Cause Register A to present a five second flashing display - all bits will flash except the one under test;
(7) Return Register A back to normal program monitoring;
(8) Turn off the COMPUTER ACTIVITY light;
(9) Check to see if the previous button is still on;
(10) Check the 60 second time limit, and
(11) Keeps checking to see if previous button is still on. When it is de-energized, the program will check for the next button to be energized, and it also keeps track of the 60 second time limit since the COMPUTER ACTIVITY light was turned off.
(12) When next button is energized, start with step (3) again until all bits in Channel 30, 31 and 32 are tested.

After Channel 32 bit 10 is tested, the program will switch to the success routine which will be displayed on Register L as 70707 alternating with 07070.

The DSKY indications used in this test and their interpretation are listed below:

NO ATTITUDE:	Operator failed to energize the next test bit within one minute of completion of testing of last bit. Will notify operator of an energized bit not received by the computer (Register A will also not give 5 second display).

KEY RELEASE:	Two adjacent switches are energized together for 30 seconds. This situation occurs when the operator energizes the switch to be tested before he de-energized the previous switch which was just checked.
OPERATOR ERROR:	Hardware failure. Detection of an improper bit being energized in channel being tested. Detection of a bit in another channel being energized when correct bit in channel being tested is energized. Detection of a bit energized out of sequence in channel being tested. Detection of an improper bit in Channel 30, 31 and 32 will be displayed on the DSKY as follows: Verb - channel where error was detected. Register 1 - Octal display of Channel 30. Register 2 - Octal display of Channel 31. Register 3 - Octal display of Channel 32.
PROGRAM ALARM:	Program Failure. Check contents of Register Q for location of program failure generation.

If any error condition occurs the operator transfers control back to location 3, 1400 and reruns the test again. If the error resulted from improper operation of the hardware under test, and a second error occurs, discontinue further testing.

7. Transfer Control to E Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

8. Press the MONITOR indicator switch to the on (illuminated) position.

9. Press the CL Key.

10. Set the T12 COUNTER STOP switch to the OFF position.

11. Set the INHIBIT INCREMENTS switch to the OFF position.

12. Press the PROCEED button.

13. Verify that the DSKY COMP ACTY indicator switches off.

NOTE: CH30, 31, and 32 are alternate-action indicator switches which are illuminated in the energized position. To turn on any switch press to the illuminated position. To turn off any switch press to the extinguished position.

14. If an error condition occurs in any part of this test, perform steps 137 and 138.

15. Press CH30-1/IN0-1 to the on (illuminated) position.

16. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

17. Press CH30-1/IN0-1 to the off position.

18. Press CH30-2/IN0-2 to the on position.

19. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

20. Press CH30-2/IN0-2 to the off position.

21. Press CH30-3/IN0-3 to the on position.

22. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

23. Press CH30-3/IN0-3 to the off position.

24. Press CH30-4/IN0-4 to the on position.

25. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

26. Press CH30-4/IN0-4 to the off position.

27. Press CH30-5/IN0-5 to the on position.

28. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

29. Press CH30-5/IN0-5 to the off position.

30. Press CH30-6/IN0-6 to the on position.

31. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

32. Press CH30-6/IN0-6 to the off position.

33. Press CH30-7/IN0-7 to the on position.

34. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

35. Press CH30-7/IN0-7 to the off position.

36. Press CH30-8/IN0-8 to the on position.

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37. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

38. Press CH30-8/IN0-8 to the off position.

39. Press CH30-9/IN0-9 to the on position.

40. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

41. Press CH30-9/IN0-9 to the off position.

42. Press CH30-10/IN0-10 to the on position.

43. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

44. Press CH30-10/IN0-10 to the off position.

45. Press CH30-11/IN0-11 to the on position.

46. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

47. Press CH30-11/IN0-11 to the off position.

48. Press CH30-12/IN0-12 to the on position.

49. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

50. Press CH30-12/IN0-12 to the off position.

51. Press CH30-13/IN0-13 to the on position.

52. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

53. Press CH30-13/IN0-13 to the off position.

54. Press CH30-14/IN0-14 to the on position.

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55. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

56. Press CH30-14/IN0-14 to the off position.

57. Press CH30-15/IN0-15 to the on position.

58. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

59. Press CH30-15/IN0-15 to the off position.

60. Press CH31-1/IN2-1 to the on position.

61. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

62. Press CH31-1/IN2-1 to the off position.

63. Press CH31-2/IN2-2 to the on position.

64. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

65. Press CH31-2/IN2-2 to the off position.

66. Press CH31-3/IN2-3 to the on position.

67. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

68. Press CH31-3/IN2-3 to the off position.

69. Press CH31-4/IN2-4 to the on position.

70. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

71. Press CH31-4/IN2-4 to the off position.

72. Press CH31-5/IN2-5 to the on position.

73. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

74. Press CH31-5/IN2-5 to the off position.

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75. Press CH31-6/IN2-6 to the on position.

76. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

77. Press CH31-6/IN2-6 to the off position.

78. Press CH31-7/IN2-7 to the on position.

79. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

80. Press CH31-7/IN2-7 to the off position.

81. Press CH31-8/IN2-8 to the on position.

82. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

83. Press CH31-8/IN2-8 to the off position.

84. Press CH31-9/IN2-9 to the on position.

85. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

86. Press CH31-9/IN2-9 to the off position.

87. Press CH31-10/IN2-10 to the on position.

88. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

89. Press CH31-10/IN2-10 to the off position.

90. Press CH31-11/IN2-11 to the on position.

91. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

92. Press CH31-11/IN2-11 to the off position.

93. Press CH31-12/IN2-12 to the on position.

94. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

95. Press CH31-12/IN2-12 to the off position.

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96. Press CH31-13/IN2-13 to the on position.

97. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

98. Press CH31-13/IN2-13 to the off position.

99. Press CH31-14/IN2-14 to the on position.

100. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

101. Press CH31-14/IN2-14 to the off position.

102. Press CH31-15/IN2-15 to the on position.

103. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

104. Press CH31-15/IN2-15 to the off position.

105. Press CH32-1/IN3-1 to the on position.

106. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

107. Press CH32-1/IN3-1 to the off position.

108. Press CH32-2/IN3-2 to the on position.

109. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

110. Press CH32-2/IN3-2 to the off position.

111. Press CH32-3/IN3-3 to the on position.

112. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

113. Press CH32-3/IN3-3 to the off position.

114. Press CH32-4/IN3-4 to the on position.

115. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

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b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

116. Press CH32-4/IN3-4 to the off position.

117. Press CH32-5/IN3-5 to the on position.

118. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

119. Press CH32-5/IN3-5 to the off position.

120. Press CH32-6/IN3-6 to the on position.

121. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

122. Press CH32-6/IN3-6 to the off position.

123. Press CH32-7/IN3-7 to the on position.

124. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

125. Press CH32-7/IN3-7 to the off position.

126. Press CH32-8/IN3-8 to the on position.

127. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

128. Press CH32-8/IN3-8 to the off position.

129. Press CH32-9/IN3-9 to the on position.

130. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

131. Press CH32-9/IN3-9 to the off position.

132. Press CH32-10/IN3-10 to the on position.

133. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

134. Press CH32-10/IN3-10 to the off position.

135. Set the register select switch to the L position.

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136. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this section of the test has been successfully completed. Stamp data sheet and proceed to step 139 of this JDC.

137. Set the T12 COUNTER STOP switch to the on position.

138. Starting with step 7, perform the procedures of this JDC again. If the failure occurs again discontinue further testing.

PROGRAM ANALYSIS - DSKY SPACECRAFT SIGNALS

This program exercises the DSKY Relays which transmit discrete signals to the spacecraft. This section of the ALLEREST program is composed of 12 test exercises which activate certain DSKY Relays in turn producing a visual indication on the MAIN and NAV DSKY sections of the CTS Interface panel. Tests are performed incrementally with the program pausing at the conclusion of each test to signal the operator with the COMP ACTY light that it is waiting to perform the next test. The operator allows the next test to be performed by pressing Bit 1 of Channel 30 (RDC Interface) twice. Bit 1 of Channel 30 is an alternate action switch which is off initially. On the first actuation Bit 1 is turned on allowing the program to extinguish COMP ACTY. Then the program waits for the next (off) actuation of Bit 1. When Bit 1 is switched off the program will perform the next test. The first set of procedures described under 1 below are concerned with initialization procedures.

1. Program Initialization Routine

a. Turns on DSKY RESTART (Bit 10, Channel 11) light.

b. Switches to ALRMOFF (Location 1465) which in sequence performs the following:

1. Load 60000 into Channel 10, turning off DSKY indicators PROGRAM, TRACKER, GIMBAL LOCK, NO ATT, and, in those systems which contain the lights, FREE (or VEL), HOLD (or SPARE), AUTO (or SPARE), and ALT.

2. Stores return address (Q) in 0112.

3. Writes PZ (positive zero) into Channels 12, 13, and 33.

4. Reads and Masks Bit 14 of Channel 33 (WARNING light).

5. Tests bit 14 for the off condition. If it is on, the program will turn on the OPERATOR ERROR light (Channel 11, Bit 7) to indicate to the operator that the AGC WARNING is set. The program will then go back and read Channel 33 again and check for bit 14 for the off condition. If the AGC WARNING is off, the program will load PZ into Channel 11 and continue the program.

6. Switches back to the return address as stored in 0112.

c. Loads PZ into the Index location (TESEL).

d. Switches out to COMPON (location 1515) where it writes 00002 into Channel 11 turning on the COMP ACTY light.

The COMPON and ALRM OFF subroutines are used as integral portions of the test routine described below. The program procedures described under 2 are valid for any test being performed in this section with the only difference being the end result, i.e., the actual indicators illuminated on the DSKY and on the XY Interface panel of the CTS.

2. Program Testing Routine

a. Turn on COMP ACTY. Read Channel 30 and Mask with Bit one and test results with a CCS.

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b. If the operator has not pushed the button the program stays in a loop which continues to RDCH30 and test for the anticipated switch actuation.

c. When the switch (Bit 1 CH30) is actuated the program switches to the ALRM OFF subroutine resetting the COMP ACTY light and again checks for AGC WARNING (Channel 33, Bit 14) off condition.

d. The program then switches back to the main program and the next instruction is another RDCH30. Channel 30 is read and Masked with bit one and tested with another CCS instruction (at 1414), but this time the test is for a POSITIVE NON-ZERO accumulator, indicating that the operator has de-energized Bit of CH30.

e. The CCS instruction above switches the program to an Index (location 1542) instruction. The Index location (TESEL) in combination with the TC (to 1525) to the test table (TSTAB) instruction provides a switch which selects the next test (in sequence) from the table.

f. TSTAB will switch the program into the proper test subroutine which will set up the DSKY Relay word to illuminate the specified indicators.

g. After the indicators have been turned on the program will increment TESEL (Index) so that the next location in the test table will be selected after the operator repeats the on-off switching sequence of Bit 1 Channel 30. The program will loop back to (a) above and repeat (a) through (g) for the next test sequence.

There is no success display provided at the end of this particular section of the ALLEREST. The test will be completed successfully if all of the indicators and alarms specified in the steps below illuminate and extinguish in accordance with the procedure.

139. Set the T12 COUNTER STOP switch to the ON position.

140. Transfer Control to E Bank 4, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

141. Press RDC Interface switch CH30-15/IN0-15 to the on (illuminated) position. Verify TEMP alarm indicator on DSKY turns off.

142. Press the MONITOR indicator switch to the on (illuminated) position.

143. Press the CL Key.

144. Set switches INHIBIT INCREMENTS and T12 COUNTER STOP to the OFF position.

145. Press the PROCEED button, then the ALARM RESET button.

146. When the COMP ACT light (after a delay of approximately 10 seconds) appears on either DSKY, verify the following:

a. All lights are OFF in the MAIN DSKY section of the XY Interface Panel.

b. All lights are OFF in the NAV DSKY section of the XY Interface Panel.

c. All alarm lights on the DSKY are OFF.

NOTE: RDC Interface switch CH30-1 is an alternate action indicator switch which is illuminated in the on state and extinguished in the off state. When performing any steps which require CH30-1 to be turned on and off, allow an approximate 3 second delay between switch actuations. Omit NAV DSKY callouts in the following steps if this procedure is being performed during LM CSS checkout.

147. Press the CH30-1 on and then off.

148. On either DSKY verify that the COMP ACTY light is ON.

149. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M37, M42, N25, and N30.

150. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

151. Press CH30-1 OFF.

152. On either DSKY verify that the COMP ACTY light is on.

153. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M34 and N20.

154. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

155. Press CH30-1 OFF.

156. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M36 and N19.

157. On either DSKY verify that the COMP ACTY light is ON.

158. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

159. Press CH30-1 OFF.

160. On either DSKY verify that the COMP ACTY light is ON.

161. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M41 and N29.

162. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

163. Press CH30-1 OFF.

164. On either DSKY verify that the COMP ACTY and GIMBAL LOCK lights are ON.

165. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

166. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

167. Press CH30-1 OFF.

168. On either DSKY verify that the COMP ACTY light is ON.

169. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M31 and N21.

170. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

171. Press CH30-1 OFF.

172. On either DSKY verify that the COMP ACTY and TRACKER lights are ON.

173. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

174. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

175. Press CH30-1 OFF.

176. On either DSKY verify that the COMP ACTY and PROGRAM lights are ON.

177. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

178. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

179. Press CH30-1 OFF.

180. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

181. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

182. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

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183. Press CH30-15 and CH30-1 OFF.

184. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

185. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

186. Press CH30-15 and CH30-1 ON and verify that the lights of the two preceding steps go OFF.

187. Press CH30-1 OFF.

188. On either DSKY verify that the COMP ACTY, STBY and RESTART lights are ON.

189. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M32, M38, M39 and M40 N22, N26, N27 and N28.

190. Press CH30-1 ON.

191. Press ALARM RESET.

192. When the COMP ACTY light goes OFF, verify that all lights on the DSKY section of the XY Interface Panel are OFF.

193. Press CH30-1 OFF.

194. Set T12 and INHIBIT INCREMENT switches ON.

195. Stamp data sheet if the test was successfully completed. If a failure occurred during this test repeat all steps starting with step 140. If a second failure occurs, discontinue further testing.

PROGRAM ANALYSIS - DSKY DISPLAY

The DSKY Test is a fully automatic test routine which starts in Bank 5, Location 1400 and is applicable to both DSKY's. The sequence of program functions are performed in the order listed below.

a. Clears all DSKY Indicators and Display Registers.

b. Lights DSKY Indicators one at a time in the order listed below:

1. UPLINK
2. NO ATT
3. KEY REL (Flashing)
4. TEMP
5. GIMBAL LOCK
6. PROG
7. TRACKER
8. OPR ERR (Flashing)

c. Lights DSKY Indicators RESTART and STBY together.

d. Lights entire panel with KEY REL and OPR ERR flashing.

e. Turns on DSKY COMP ACTY indicator. (This indicator will remain on for the DSKY Register test.)

f. Writes +00000 into DSKY Registers 1, 2, and 3 and flashes 00 in the VERB and NOUN displays and non-flashing 00 in the PROGRAM display.

g. Writes -11111 into DSKY Registers 1, 2, and 3 and flashes 11 in the VERB and NOUN displays and non-flashing 11 in the PROGRAM display.

h. Writes +22222 into DSKY Registers 1, 2, and 3 and flashes 22 in the VERB and NOUN displays and non-flashing 22 in the PROGRAM display.

i. Writes -33333 into DSKY Registers 1, 2, and 3 and flashes 33 in the VERB and NOUN displays and non-flashing 33 in the PROGRAM display.

j. Writes +44444 into DSKY Registers 1, 2, and 3 and flashes 44 in the VERB and NOUN displays and non-flashing 44 in the PROGRAM display.

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k. Writes -55555 into DSKY Registers 1, 2, and 3 and flashes 55 in the VERB and NOUN displays and non-flashing 55 in the PROGRAM display.

l. Writes +66666 into DSKY Registers 1, 2, and 3 and flashes 66 in the VERB and NOUN displays and non-flashing 66 in the PROGRAM display.

m. Writes -77777 into DSKY Registers 1, 2, and 3 and flashes 77 in the VERB and NOUN displays and non-flashing 77 in the PROGRAM display.

n. Writes +88888 into DSKY Registers 1, 2, and 3 and flashes 88 in the VERB and NOUN displays and non-flashing 88 in the PROGRAM display.

o. Writes -99999 into DSKY Registers 1, 2, and 3 and flashes 99 in the VERB and NOUN displays and non-flashing 99 in the PROGRAM display.

p. Displays 70707 alternating with 07070 on the REG SEL display (with register select switch set to L). This display will be presented for 15 seconds, after which time the entire test will automatically repeat. The T12 COUNTER STOP switch should be set to the ON position during this display, so that all DSKY displays will be in the clear condition at the conclusion of testing. Success or failure of this test is determined visually by the operator noting that all displays occur as specified.

196. Transfer Control to E Bank 5, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

197. Press the MONITOR indicator switch to the on (illuminated) position and set the register select switch to the L position.

198. Press the CL Key.

199. Set the T12 COUNTER STOP switch to the OFF position.

200. Set the INHIBIT INCREMENTS switch to the OFF position.

201. Press the PROCEED button.

202. Verify that the DSKY UPLINK ACTY indicator turns on.

203. Verify that DSKY indicator:
UPLINK ACTY turns off
NO ATT turns on

204. Verify that DSKY indicator:
NO ATT turns off
KEY REL turns on and is flashing

205. Verify that DSKY indicator:
KEY REL turns off
TEMP turns on

206. Verify that DSKY indicator:
TEMP turns off
GIMBAL LOCK turns on

207. Verify that DSKY indicator:
GIMBAL LOCK turns off
PROG turns on

208. Verify that DSKY indicator:
PROG turns off
TRACKER turns on

209. Verify that TRACKER indicator turns off

210. Verify that DSKY OPR ERR indicator turns on and is flashing

211. Verify that DSKY indicator:
OPR ERR turns off
RESTART and STBY turn on together

212. Verify that all of the DSKY indicators mentioned above, are on with the KEY REL and OPR ERR indicators flashing:

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213. Verify that the DSKY COMP ACTY indicator turns on. This indicator should remain on for the rest of the test.

214. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +00000
Register 2 = +00000
Register 3 = +00000
VERB = 00 (Flashing)
NOUN = 00 (Flashing)
PROGRAM = 00

215. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -11111
Register 2 = -11111
Register 3 = -11111
VERB = 11 (Flashing)
NOUN = 11 (Flashing)
PROGRAM = 11

216. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +22222
Register 2 = +22222
Register 3 = +22222
VERB = 22 (Flashing)
NOUN = 22 (Flashing)
PROGRAM = 22

217. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -33333
Register 2 = -33333
Register 3 = -33333
VERB = 33 (Flashing)
NOUN = 33 (Flashing)
PROGRAM = 33

218. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +44444
Register 2 = +44444
Register 3 = +44444
VERB = 44 (Flashing)
NOUN = 44 (Flashing)
PROGRAM = 44

219. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -55555
Register 2 = -55555
Register 3 = -55555
VERB = 55 (Flashing)
NOUN = 55 (Flashing)
PROGRAM = 55

220. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +66666
Register 2 = +66666
Register 3 = +66666
VERB = 66 (Flashing)
NOUN = 66 (Flashing)
PROGRAM = 66

221. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -77777
Register 2 = -77777
Register 3 = -77777
VERB = 77 (Flashing)
NOUN = 77 (Flashing)
PROGRAM = 77

222. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +88888
Register 2 = +88888
Register 3 = +88888
VERB = 88 (Flashing)
NOUN = 88 (Flashing)
PROGRAM = 88

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223. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -99999
Register 2 = -99999
Register 3 = -99999
VERB = 99 (Flashing)
NOUN = 99 (Flashing)
PROGRAM = 99

224. Verify that the DSKY display is clear, and the REG SEL display is 70707 alternating with 07070. Set the T12 COUNTER STOP switch to the ON position immediately after verifying the REG SEL display. If a failure was observed during this test, do not turn ON the T12 COUNTER STOP switch. Allow the test program to recycle twice, and if the malfunction is still present, discontinue further testing. Stop the computer coincident with the REG SEL display, as described above.

225. Set the INHIBIT INCREMENT switch to the ON position.

226. Press the FRESH START button. Verify RESTART alarm indicator on DSKY turns on. Stamp data sheet if test was successful.

227. Deleted.

DATE 26 JAN 67

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

NO. 05783 JDC
REV. F
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

ASSEMBLY UNDER TEST	TEST HISTORY
TITLE ______	DATE ______ START ______ END ______ SITE / LOCATION
SER. NO. ______ DWG ______ REV. ______	TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
136.	Channels 30, 31, and 32 test (steps 7 through 136) completed successfully.		
195.	DSKY Spacecraft Signals (steps 139 through 195) completed successfully.		
226.	DSKY Display test (steps 196 through 225) completed successfully.		

DATE 26 JAN 67

JOB OPERATING PROCEDURE FOR (FVP)
PROGRAM-ALLEREST

JDC 05783 **REV.** G **PAGE** 1 **OF** 17
INITIAL TDRR 32809 **D.S. PGS** 1

SUBSYSTEM Computer | **ASSY.** Block II - C Computer

DESCRIPTION

Program ALLEREST contains three separate tests, the first of which tests the operation of Channels 30, 31, and 32. The next test checks the operation of the DSKY relays used to transmit signals to the spacecraft. The last test checks the operation of the DSKY Indicators and Display Registers. It is recommended that the Program Analysis sections of this JDC be reviewed prior to testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-7-67	34517	4, 10, 12-17	All	EA	-
B	11-16-67	35057	3-10, 12, 15	-	EA	-
C	3-22-68	35899	1, 12, 17	-	EA	-
D	10-17-68	36907	1, 3, 11, 14, 16, 17	-	EA	-
E	1-20-69	37204	11	-	EA	-
F	2-27-69	37374	1	-	EA	-
G	6-16-69	37647	4,11,13-17	-	EA	-

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program ALLEREST Mylar Tape, JDC 05784

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the RDC Interface panel of the CTS.

3. Load PROGRAM ALLEREST (JDC 05784) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407, Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

PROGRAM ANALYSIS - CHANNELS 30, 31, AND 32

The programmed functions of this portion of the test checks that 30, 31, and 32 receive DC signals in the proper bit positions via the interface module. Initially, the program verifies that

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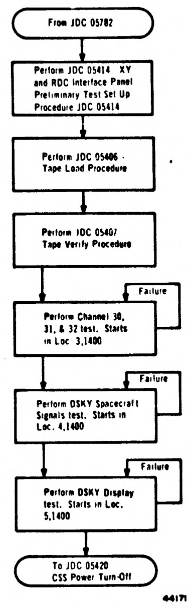
From JDC 05782
Perform JDC 05414 XY and RDC Interface Panel Preliminary Test Set Up Procedure JDC 05414
Perform JDC 05406 Tape Load Procedure
Perform JDC 05407 Tape Verify Procedure
Failure
Perform Channel 30, 31, & 32 test. Starts in Loc 3,1400
Failure
Perform DSKY Spacecraft Signals test. Starts in Loc. 4,1400
Failure
Perform DSKY Display test. Starts in Loc. 5,1400
To JDC 05420 CSS Power Turn-Off
44171

Figure 1. Flowchart for Performing Program ALLEREST

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all the bit positions of channels 30, 31 and 32 are de-energized. The program will:

(1) Turn on the COMPUTER ACTIVITY light;
(2) Blank the DSKY (PROGRAM, VERB, R1, R2, R3, PROGRAM ALARM, GIMBAL LOCK, TRACKER, NO ATTITUDE);
(3) Check to see that all the bit positions of channels 30, 31, and 32 are de-energized;
(4) and, if all bits are de-energized, turn off the COMPUTER ACTIVITY light.

Extinguishing of the COMPUTER ACTIVITY light signals the operator to start the switching sequence at the RDC interface panel, beginning with channel 30, bit 1 - ending with channel 32, bit 10.

At this point and throughout the remainder of the switching sequence the program looks for a switch to be energized. When the program detects an actuation it enters a routine to determine that it was the proper switch, and checks the other two channels to make sure that they do not have bits present. If no discrepancies are noted during these checks, the computer will turn on the DSKY COMPUTER ACTIVITY light and register A will present a five second flashing display - all bits will flash except the one under test. At the end of this period the program will turn off the DSKY COMPUTER ACTIVITY light and register A goes back to normal program monitoring. Extinguishing of the COMPUTER ACTIVITY light signals the operator to de-energize the switch/bit just tested and energize the next switch/bit position.

When one channel has been completely tested, the test is continued by actuating switch/bit number one of the next channel. The last switch/bit energized in the sequence is channel 32, bit 10. The program will:

(1) Wait for the switch to be energized;
(2) Check the 60 second time limit;
(3) Check that the proper bit was energized;
(4) Check that bits in the other two channels are de-energized;
(5) Turn on the COMPUTER ACTIVITY light;
(6) Cause Register A to present a five second flashing display - all bits will flash except the one under test;
(7) Return Register A back to normal program monitoring;
(8) Turn off the COMPUTER ACTIVITY light;
(9) Check to see if the previous button is still on;
(10) Check the 60 second time limit, and
(11) Keeps checking to see if previous button is still on. When it is de-energized, the program will check for the next button to be energized, and it also keeps track of the 60 second time limit since the COMPUTER ACTIVITY light was turned off.
(12) When next button is energized, start with step (3) again until all bits in Channel 30, 31 and 32 are tested.

After Channel 32 bit 10 is tested, the program will switch to the success routine which will be displayed on Register L as 70707 alternating with 07070.

The DSKY indications used in this test and their interpretation are listed below:

NO ATTITUDE:	Operator failed to energize the next test bit within one minute of completion of testing of last bit. Will notify operator of an energized bit not received by the computer (Register A will also not give 5 second display).

KEY RELEASE:	Two adjacent switches are energized together for 30 seconds. This situation occurs when the operator energizes the switch to be tested before he de-energized the previous switch which was just checked.
OPERATOR ERROR:	Hardware failure. Detection of an improper bit being energized in channel being tested. Detection of a bit in another channel being energized when correct bit in channel being tested is energized. Detection of a bit energized out of sequence in channel being tested.
	Detection of an improper bit in Channel 30, 31 and 32 will be displayed on the DSKY as follows: Verb - channel where error was detected. Register 1 - Octal display of Channel 30. Register 2 - Octal display of Channel 31. Register 3 - Octal display of Channel 32.
PROGRAM ALARM:	Program Failure. Check contents of Register Q for location of program failure generation.

If any error condition occurs the operator transfers control back to location 3,1400 and reruns the test again. If the error resulted from improper operation of the hardware under test, and a second error occurs, discontinue further testing.

7. Transfer Control to E Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

8. Press the MONITOR indicator switch to the on (illuminated) position.

9. Press the CL Key.

10. Set the T12 COUNTER STOP switch to the OFF position.

11. Set the INHIBIT INCREMENTS switch to the OFF position.

12. Press the PROCEED button.

13. Verify that the DSKY COMP ACTY indicator switches off.

NOTE: CH30, 31, and 32 are alternate-action indicator switches which are illuminated in the energized position. To turn on any switch press to the illuminated position. To turn off any switch press to the extinguished position. Temp lamp ON (CH3015).

14. If an error condition occurs in any part of this test, perform steps 137 and 138.

15. Press CH30-1/IN0-1 to the on (illuminated) position.

16. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

17. Press CH30-1/IN0-1 to the off position.

18. Press CH30-2/IN0-2 to the on position.

19. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

20. Press CH30-2/IN0-2 to the off position.

21. Press CH30-3/IN0-3 to the on position.

22. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

23. Press CH30-3/IN0-3 to the off position.

24. Press CH30-4/IN0-4 to the on position.

25. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

26. Press CH30-4/IN0-4 to the off position.

27. Press CH30-5/IN0-5 to the on position.

28. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

29. Press CH30-5/IN0-5 to the off position.

30. Press CH30-6/IN0-6 to the on position.

31. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

32. Press CH30-6/IN0-6 to the off position.

33. Press CH30-7/IN0-7 to the on position.

34. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

35. Press CH30-7/IN0-7 to the off position.

36. Press CH30-8/IN0-8 to the on position.

37. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

38. Press CH30-8/IN0-8 to the off position.

39. Press CH30-9/IN0-9 to the on position.

40. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

41. Press CH30-9/IN0-9 to the off position.

42. Press CH30-10/IN0-10 to the on position.

43. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

44. Press CH30-10/IN0-10 to the off position.

45. Press CH30-11/IN0-11 to the on position.

46. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

47. Press CH30-11/IN0-11 to the off position.

48. Press CH30-12/IN0-12 to the on position.

49. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

50. Press CH30-12/IN0-12 to the off position.

51. Press CH30-13/IN0-13 to the on position.

52. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

53. Press CH30-13/IN0-13 to the off position.

54. Press CH30-14/IN0-14 to the on position.

55. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

56. Press CH30-14/IN0-14 to the off position.

57. Press CH30-15/IN0-15 to the on position.

58. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

59. Press CH30-15/IN0-15 to the off position.

60. Press CH31-1/IN2-1 to the on position.

61. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

62. Press CH31-1/IN2-1 to the off position.

63. Press CH31-2/IN2-2 to the on position.

64. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

65. Press CH31-2/IN2-2 to the off position.

66. Press CH31-3/IN2-3 to the on position.

67. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

68. Press CH31-3/IN2-3 to the off position.

69. Press CH31-4/IN2-4 to the on position.

70. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

71. Press CH31-4/IN2-4 to the off position.

72. Press CH31-5/IN2-5 to the on position.

73. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

74. Press CH31-5/IN2-5 to the off position.

75. Press CH31-6/IN2-6 to the on position.

76. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

77. Press CH31-6/IN2-6 to the off position.

78. Press CH31-7/IN2-7 to the on position.

79. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

80. Press CH31-7/IN2-7 to the off position.

81. Press CH31-8/IN2-8 to the on position.

82. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

83. Press CH31-8/IN2-8 to the off position.

84. Press CH31-9/IN2-9 to the on position.

85. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

86. Press CH31-9/IN2-9 to the off position.

87. Press CH31-10/IN2-10 to the on position.

88. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

89. Press CH31-10/IN2-10 to the off position.

90. Press CH31-11/IN2-11 to the on position.

91. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

92. Press CH31-11/IN2-11 to the off position.

93. Press CH31-12/IN2-12 to the on position.

94. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

95. Press CH31-12/IN2-12 to the off position.

96. Press CH31-13/IN2-13 to the on position.

97. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

98. Press CH31-13/IN2-13 to the off position.

99. Press CH31-14/IN2-14 to the on position.

100. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

101. Press CH31-14/IN2-14 to the off position.

102. Press CH31-15/IN2-15 to the on position.

103. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

104. Press CH31-15/IN2-15 to the off position.

105. Press CH32-1/IN3-1 to the on position.

106. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

107. Press CH32-1/IN3-1 to the off position.

108. Press CH32-2/IN3-2 to the on position.

109. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

110. Press CH32-2/IN3-2 to the off position.

111. Press CH32-3/IN3-3 to the on position.

112. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

113. Press CH32-3/IN3-3 to the off position.

114. Press CH32-4/IN3-4 to the on position.

115. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

116. Press CH32-4/IN3-4 to the off position.

117. Press CH32-5/IN3-5 to the on position.

118. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

119. Press CH32-5/IN3-5 to the off position.

120. Press CH32-6/IN3-6 to the on position.

121. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

122. Press CH32-6/IN3-6 to the off position.

123. Press CH32-7/IN3-7 to the on position.

124. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

125. Press CH32-7/IN3-7 to the off position.

126. Press CH32-8/IN3-8 to the on position.

127. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

128. Press CH32-8/IN3-8 to the off position.

129. Press CH32-9/IN3-9 to the on position.

130. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

131. Press CH32-9/IN3-9 to the off position.

132. Press CH32-10/IN3-10 to the on position.

133. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

134. Press CH32-10/IN3-10 to the off position.

135. Set the register select switch to the L position.

136. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this section of the test has been successfully completed. Stamp data sheet and proceed to step 139 of this JDC.

137. Set the T12 COUNTER STOP switch to the on position.

138. Starting with step 7, perform the procedures of this JDC again. If the failure occurs again discontinue further testing.

PROGRAM ANALYSIS - DSKY SPACECRAFT SIGNALS

This program exercises the DSKY Relays which transmit discrete signals to the spacecraft. This section of the ALLEREST program is composed of 12 test exercises which activate certain DSKY Relays in turn producing a visual indication on the MAIN and NAV DSKY sections of the CTS Interface panel. Tests are performed incrementally with the program pausing at the conclusion of each test to signal the operator with the COMP ACTY light that it is waiting to perform the next test. The operator allows the next test to be performed by pressing Bit 1 of Channel 30 (RDC Interface) twice. Bit 1 of Channel 30 is an alternate action switch which is off initially. On the first actuation Bit 1 is turned on allowing the program to extinguish COMP ACTY. Then the program waits for the next (off) actuation of Bit 1. When Bit 1 is switched off the program will perform the next test. The first set of procedures described under 1 below are concerned with initialization procedures.

1. Program Initialization Routine

a. Turns on DSKY RESTART (Bit 10, Channel 11) light.

b. Switches to ALRMOFF (Location 1465) which in sequence performs the following:

1. Load 60000 into Channel 10, turning off DSKY indicators PROGRAM, TRACKER, GIMBAL LOCK, NO ATT, and, in those systems which contain the lights, ALT, VEL, and 2 SPARES.

2. Stores return address (Q) in 0112.

3. Writes PZ (positive zero) into Channels 12, 13, and 33.

4. Reads and Masks Bit 14 of Channel 33 (WARNING light).

5. Tests bit 14 for the off condition. If it is on, the program will turn on the OPERATOR ERROR light (Channel 11, Bit 7) to indicate to the operator that the AGC WARNING is set. The program will then go back and read Channel 33 again and check for bit 14 for the off condition. If the AGC WARNING is off, the program will load PZ into Channel 11 and continue the program.

6. Switches back to the return address as stored in 0112.

c. Loads PZ into the Index location (TESEL).

d. Switches out to COMPON (location 1515) where it writes 00002 into Channel 11 turning on the COMP ACTY light.

The COMPON and ALRM OFF subroutines are used as integral portions of the test routine described below. The program procedures described under 2 are valid for any test being performed in this section with the only difference being the end result, i.e., the actual indicators illuminated on the DSKY and on the XY Interface panel of the CTS.

2. Program Testing Routine

a. Turn on COMP ACTY. Read Channel 30 and Mask with Bit one and test results with a CCS.

b. If the operator has not pushed the button the program stays in a loop which continues to RDCH30 and test for the anticipated switch actuation.

c. When the switch (Bit 1 CH30) is actuated the program switches to the ALRM OFF subroutine resetting the COMP ACTY light and again checks for AGC WARNING (Channel 33, Bit 14) off condition.

d. The program then switches back to the main program and the next instruction is another RDCH30. Channel 30 is read and Masked with bit one and tested with another CCS instruction (at 1414), but this time the test is for a POSITIVE NON-ZERO accumulator, indicating that the operator has de-energized Bit of CH30.

e. The CCS instruction above switches the program to an Index (location 1542) instruction. The Index location (TESEL) in combination with the TC (to 1525) to the test table (TSTAB) instruction provides a switch which selects the next test (in sequence) from the table.

f. TSTAB will switch the program into the proper test subroutine which will set up the DSKY Relay word to illuminate the specified indicators.

g. After the indicators have been turned on the program will increment TESEL (Index) so that the next location in the test table will be selected after the operator repeats the on-off switching sequence of Bit 1 Channel 30. The program will loop back to (a) above and repeat (a) through (g) for the next test sequence.

There is no success display provided at the end of this particular section of the ALLEREST. The test will be completed successfully if all of the indicators and alarms specified in the steps below illuminate and extinguish in accordance with the procedure.

139. Set the T12 COUNTER STOP switch to the ON position.

140. Transfer Control to E Bank 4, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

141. Press RDC Interface switch CH30-15/IN0-15 to the on (illuminated) position. Verify TEMP alarm indicator on DSKY turns off.

142. Press the MONITOR indicator switch to the on (illuminated) position.

143. Press the CL Key.

144. Set switches INHIBIT INCREMENTS and T12 COUNTER STOP to the OFF position.

145. Press the PROCEED button, then the ALARM RESET button.

146. When the COMP ACT light (after a delay of approximately 10 seconds) appears on either DSKY, verify the following:

a. All lights are OFF in the MAIN DSKY section of the XY Interface Panel.

b. All lights are OFF in the NAV DSKY section of the XY Interface Panel.

c. All alarm lights on the DSKY are OFF.

NOTE: RDC Interface switch CH30-1 is an alternate action indicator switch which is illuminated in the on state and extinguished in the off state. When performing any steps which require CH30-1 to be turned on and off, allow an approximate 3 second delay between switch actuations.

Omit NAV DSKY callouts in the following steps if this procedure is being performed during LM CSS checkout.

147. Press the CH30-1 on and then off.

148. On either DSKY verify that the COMP ACTY light is ON.

149. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M37, M42, N25, and N30.

150. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

151. Press CH30-1 OFF.

152. On either DSKY verify that the COMP ACTY light is on.

153. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M34 and N20.

154. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

155. Press CH30-1 OFF.

156. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M36 and N19.

157. On either DSKY verify that the COMP ACTY light is ON.

158. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

159. Press CH30-1 OFF.

160. On either DSKY verify that the COMP ACTY light is ON and blank.

161. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M41 and N29.

162. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

163. Press CH30-1 OFF.

164. On either DSKY verify that the COMP ACTY and GIMBAL LOCK lights are ON.

165. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

166. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

167. Press CH30-1 OFF.

168. On either DSKY verify that the COMP ACTY light is ON.

169. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M31 and N21.

170. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

171. Press CH30-1 OFF.

172. On either DSKY verify that the COMP ACTY and TRACKER lights are ON.

173. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

174. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

175. Press CH30-1 OFF.

176. On either DSKY verify that the COMP ACTY and PROGRAM lights are ON.

177. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

178. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

179. Press CH30-1 OFF.

180. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

181. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

182. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

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183. Press CH30-15 and CH30-1 OFF.

184. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

185. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

186. Press CH30-15 and CH30-1 ON and verify that the lights of the two preceding steps go OFF.

187. Press CH30-1 OFF.

188. On either DSKY verify that the COMP ACTY, STBY and RESTART lights are ON.

189. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M32, M38, M39 and M40 N22, N26, N27 and N28.

190. Press CH30-1 ON.

191. Press ALARM RESET.

192. When the COMP ACTY light goes OFF, verify that all lights on the DSKY section of the XY Interface Panel are OFF.

193. Press CH30-1 OFF.

194. Set T12 and INHIBIT INCREMENT switches ON.

195. Stamp data sheet if the test was successfully completed. If a failure occurred during this test repeat all steps starting with step 140. If a second failure occurs, discontinue further testing.

PROGRAM ANALYSIS - DSKY DISPLAY

The DSKY Test is a fully automatic test routine which starts in Bank 5, Location 1400 and is applicable to both DSKY's. The sequence of program functions are performed in the order listed below.

NOTE: DSKY indicators listed below marked with * are applicable only for LM flight and LM flight spare DSKY's.

a. Clears all DSKY Indicators and Display Registers.

b. Lights DSKY Indicators one at a time in the order listed below:

1. UPLINK
*2. SPARE
*3. SPARE
*4. VEL
5. NO ATT
6. KEY RELEASE (Flashing)
7. TEMP
8. GIMBAL LOCK
9. PROG
10. TRACKER
*11. ALT
12. OPR ERR (Flashing)

c. Lights DSKY Indicators RESTART and STBY together.

d. Lights entire panel with KEY REL and OPR ERR flashing.

e. Turns on DSKY COMP ACTY indicator. (This indicator will remain on for the DSKY Register test.)

f. Writes +00000 into DSKY Registers 1, 2, and 3 and flashes 00 in the VERB and NOUN displays and non-flashing 00 in the PROGRAM display.

g. Writes -11111 into DSKY Registers 1, 2, and 3 and flashes 11 in the VERB and NOUN displays and non-flashing 11 in the PROGRAM display.

h. Writes +22222 into DSKY Registers 1, 2, and 3 and flashes 22 in the VERB and NOUN displays and non-flashing 22 in the PROGRAM display.

i. Writes -33333 into DSKY Registers 1, 2, and 3 and flashes 33 in the VERB and NOUN displays and non-flashing 33 in the PROGRAM display.

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j. Writes +44444 into DSKY Registers 1, 2, and 3 and flashes 44 in the VERB and NOUN displays and non-flashing 44 in the PROGRAM display.

k. Writes -55555 into DSKY Registers 1, 2, and 3 and flashes 55 in the VERB and NOUN displays and non-flashing 55 in the PROGRAM display.

l. Writes +66666 into DSKY Registers 1, 2, and 3 and flashes 66 in the VERB and NOUN displays and non-flashing 66 in the PROGRAM display.

m. Writes -77777 into DSKY Registers 1, 2, and 3 and flashes 77 in the VERB and NOUN displays and non-flashing 77 in the PROGRAM display.

n. Writes +88888 into DSKY Registers 1, 2, and 3 and flashes 88 in the VERB and NOUN displays and non-flashing 88 in the PROGRAM display.

o. Writes -99999 into DSKY Registers 1, 2, and 3 and flashes 99 in the VERB and NOUN displays and non-flashing 99 in the PROGRAM display.

p. Displays 70707 alternating with 07070 on the REG SEL display (with register select switch set to L). This display will be presented for 15 seconds, after which time the entire test will automatically repeat. The T12 COUNTER STOP switch should be set to the ON position during this display, so that all DSKY displays will be in the clear condition at the conclusion of testing. Success or failure of this test is determined visually by the operator noting that all displays occur as specified.

196. Transfer Control to E Bank 5, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

197. Press the MONITOR indicator switch to the on (illuminated) position and set the register select switch to the L position.

198. Press the CL Key.

199. Set the T12 COUNTER STOP switch to the OFF position.

200. Set the INHIBIT INCREMENTS switch to the OFF position.

201. Press the PROCEED button.

202. Verify that the DSKY UPLINK ACTY indicator turns on.

NOTE: DSKY indicators listed below marked with * are applicable only for LM flight and LM flight spare DSKY's.

203. Verify that DSKY indicator:
UPLINK ACTY turns off
*BLANK (SCREEN) turns on

204. Verify that DSKY indicator:
*BLANK (SCREEN) turns off
*BLANK (SCREEN) turns on

205. Verify that DSKY indicator:
*BLANK (SCREEN) turns off
*VEL turns on

206. Verify that DSKY indicator:
*VEL turns off
NO ATT turns on

207. Verify that DSKY indicator:
NO ATT turns off
KEY REL turns on and is flashing

208. Verify that DSKY indicator:
KEY REL turns off
TEMP turns on

209. Verify that DSKY indicator:
TEMP turns off
GIMBAL LOCK turns on

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210. Verify that DSKY indicator:
GIMBAL LOCK turns off
PROG turns on

211. Verify that DSKY indicator:
PROG turns off
TRACKER turns on

212. Verify that DSKY indicator:
TRACKER turns off
*ALT turns on

213. Verify that DSKY indicator:
*ALT turns off
OPR ERR turns on and is flashing

214. Verify that DSKY indicator:
OPR ERR turns off
RESTART and STBY turn on together

215. Verify that all of the DSKY indicators mentioned above, are on with the KEY REL and OPR ERR indicators flashing.

216. Verify that the DSKY COMP ACTY indicator turns on. This indicator should remain on for the rest of the test.

217. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +00000
Register 2 = +00000
Register 3 = +00000
VERB = 00 (Flashing)
NOUN = 00 (Flashing)
PROGRAM = 00

218. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -11111
Register 2 = -11111
Register 3 = -11111
VERB = 11 (Flashing)
NOUN = 11 (Flashing)
PROGRAM = 11

219. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +22222
Register 2 = +22222
Register 3 = +22222
VERB = 22 (Flashing)
NOUN = 22 (Flashing)
PROGRAM = 22

220. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -33333
Register 2 = -33333
Register 3 = -33333
VERB = 33 (Flashing)
NOUN = 33 (Flashing)
PROGRAM = 33

221. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +44444
Register 2 = +44444
Register 3 = +44444
VERB = 44 (Flashing)
NOUN = 44 (Flashing)
PROGRAM = 44

222. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -55555
Register 2 = -55555
Register 3 = -55555
VERB = 55 (Flashing)
NOUN = 55 (Flashing)
PROGRAM = 55

223. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +66666
Register 2 = +66666
Register 3 = +66666
VERB = 66 (Flashing)
NOUN = 66 (Flashing)
PROGRAM = 66

224. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -77777
Register 2 = -77777
Register 3 = -77777
VERB = 77 (Flashing)
NOUN = 77 (Flashing)
PROGRAM = 77

225. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +88888
Register 2 = +88888
Register 3 = +88888
VERB = 88 (Flashing)
NOUN = 88 (Flashing)
PROGRAM = 88

226. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -99999
Register 2 = -99999
Register 3 = -99999
VERB = 99 (Flashing)
NOUN = 99 (Flashing)
PROGRAM = 99

227. Verify that the DSKY display is clear, and the REG SEL display is 70707 alternating with 07070. Set the T12 COUNTER STOP switch to the ON position immediately after verifying the REG SEL display. If a failure was observed during this test, do not turn ON the T12 COUNTER STOP switch. Allow the test program to recycle twice, and if the malfunction is still present, discontinue further testing. Stop the computer coincident with the REG SEL display, as described above.

228. Set the INHIBIT INCREMENT switch to the ON position.

229. Press the FRESH START button. Verify RESTART alarm indicator on DSKY turns on. Stamp data sheet if test was successful.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05783 JDC
REV. G
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

ASSEMBLY UNDER TEST	**TEST HISTORY**
TITLE ____	DATE ____ START ____ END ____ SITE / LOCATION
SER. NO. ____ DWG ____ REV. ____	TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
136.	Channels 30, 31, and 32 test (steps 7 through 136) completed successfully.		
195.	DSKY Spacecraft Signals (steps 139 through 195) completed successfully.		
226.	DSKY Display test (steps 196 through 225) completed successfully.		

OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-ALLEREST

JDC 05783 **REV.** H **PAGE** 1 **OF** 17
INITIAL TDRR 32809 **D.S. PGS** 1

SUBSYSTEM Computer
ASSY. Block II - C Computer

DESCRIPTION

Program ALLEREST contains three separate tests, the first of which tests the operation of Channels 30, 31, and 32. The next test checks the operation of the DSKY relays used to transmit signals to the spacecraft. The last test checks the operation of the DSKY Indicators and Display Registers. It is recommended that the Program Analysis sections of this JDC be reviewed prior to testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-7-67	34517	4, 10, 12-17	All	EA	-
B	11-16-67	35057	3-10, 12, 15	-	EA	-
C	3-22-68	35899	1, 12, 17	-	EA	-
D	10-17-68	36907	1, 3, 11, 14,	-	EA	-
			16, 17			
E	1-20-69	37204	11	-	EA	-
F	2-27-69	37374	1	-	EA	-
G	6-16-69	37647	4,11,13-17	-	EA	-
H	1-18-71	38310	13	-	JS	-

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program ALLEREST Mylar Tape, JDC 05784

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the RDC Interface panel of the CTS.

3. Load PROGRAM ALLEREST (JDC 05784) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407, Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

PROGRAM ANALYSIS - CHANNELS 30, 31 AND 32

The programmed functions of this portion of the test checks that 30, 31, and 32 receive DC signals in the proper bit positions via the interface module. Initially, the program verifies that

VERIFICATION WITH SIDL REQUIRED BEFORE USE

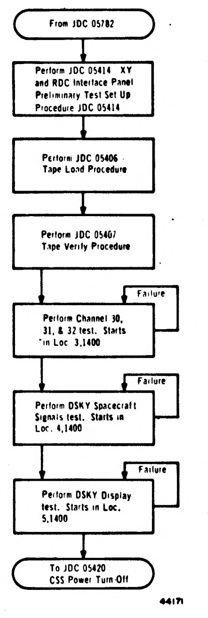
From JDC 05782
Perform JDC 05414 XY and RDC Interface Panel Preliminary Test Set Up Procedure JDC 05414
Perform JDC 05406 Tape Load Procedure
Perform JDC 05407 Tape Verify Procedure
Failure
Perform Channel 30, 31, & 32 test. Starts in Loc 3,1400
Failure
Perform DSKY Spacecraft Signals test. Starts in Loc. 4,1400
Failure
Perform DSKY Display test. Starts in Loc. 5,1400
To JDC 05420 CSS Power Turn-Off
44171

Figure 1. Flowchart for Performing Program ALLEREST

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all the bit positions of channels 30, 31 and 32 are de-energized. The program will:

(1) Turn on the COMPUTER ACTIVITY light;
(2) Blank the DSKY (PROGRAM, VERB, R1, R2, R3, PROGRAM ALARM, GIMBAL LOCK, TRACKER, NO ATTITUDE);
(3) Check to see that all the bit positions of channels 30, 31, and 32 are de-energized;
(4) and, if all bits are de-energized, turn off the COMPUTER ACTIVITY light.

Extinguishing of the COMPUTER ACTIVITY light signals the operator to start the switching sequence at the RDC interface panel, beginning with channel 30, bit 1 - ending with channel 32, bit 10.

At this point and throughout the remainder of the switching sequence the program looks for a switch to be energized. When the program detects an actuation it enters a routine to determine that it was the proper switch, and checks the other two channels to make sure that they do not have bits present. If no discrepancies are noted during these checks, the computer will turn on the DSKY COMPUTER ACTIVITY light and register A will present a five second flashing display - all bits will flash except the one under test. At the end of this period the program will turn off the DSKY COMPUTER ACTIVITY light and register A goes back to normal program monitoring. Extinguishing of the COMPUTER ACTIVITY light signals the operator to de-energize the switch/bit just tested and energize the next switch/bit position.

When one channel has been completely tested, the test is continued by actuating switch/bit number one of the next channel. The last switch/bit energized in the sequence is channel 32, bit 10. The program will:

(1) Wait for the switch to be energized;
(2) Check the 60 second time limit;
(3) Check that the proper bit was energized;
(4) Check that bits in the other two channels are de-energized;
(5) Turn on the COMPUTER ACTIVITY light;
(6) Cause Register A to present a five second flashing display - all bits will flash except the one under test;
(7) Return Register A back to normal program monitoring;
(8) Turn off the COMPUTER ACTIVITY light;
(9) Check to see if the previous button is still on;
(10) Check the 60 second time limit, and
(11) Keeps checking to see if previous button is still on. When it is de-energized, the program will check for the next button to be energized, and it also keeps track of the 60 second time limit since the COMPUTER ACTIVITY light was turned off.
(12) When next button is energized, start with step (3) again until all bits in Channel 30, 31 and 32 are tested.

After Channel 32 bit 10 is tested, the program will switch to the success routine which will be displayed on Register L as 70707 alternating with 07070.

The DSKY indications used in this test and their interpretation are listed below:

NO ATTITUDE:	Operator failed to energize the next test bit within one minute of completion of testing of last bit. Will notify operator of an energized bit not received by the computer (Register A will also not give 5 second display).

KEY RELEASE:	Two adjacent switches are energized together for 30 seconds. This situation occurs when the operator energizes the switch to be tested before he de-energized the previous switch which was just checked.
OPERATOR ERROR:	Hardware failure. Detection of an improper bit being energized in channel being tested. Detection of a bit in another channel being energized when correct bit in channel being tested is energized. Detection of a bit energized out of sequence in channel being tested.
	Detection of an improper bit in Channel 30, 31 and 32 will be displayed on the DSKY as follows: Verb - channel where error was detected. Register 1 - Octal display of Channel 30. Register 2 - Octal display of Channel 31. Register 3 - Octal display of Channel 32.
PROGRAM ALARM:	Program Failure. Check contents of Register Q for location of program failure generation.

If any error condition occurs the operator transfers control back to location 3, 1400 and reruns the test again. If the error resulted from improper operation of the hardware under test, and a second error occurs, discontinue further testing.

7. Transfer Control to E Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

8. Press the MONITOR indicator switch to the on (illuminated) position.

9. Press the CL Key.

10. Set the T12 COUNTER STOP switch to the OFF position.

11. Set the INHIBIT INCREMENTS switch to the OFF position.

12. Press the PROCEED button.

13. Verify that the DSKY COMP ACTY indicator switches off.

NOTE: CH30, 31, and 32 are alternate-action indicator switches which are illuminated in the energized position. To turn on any switch press to the illuminated position. To turn off any switch press to the extinguished position. Temp lamp ON (CH3015).

14. If an error condition occurs in any part of this test, perform steps 137 and 138.

15. Press CH30-1/IN0-1 to the on (illuminated) position.

16. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

17. Press CH30-1/IN0-1 to the off position.

18. Press CH30-2/IN0-2 to the on position.

19. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

20. Press CH30-2/IN0-2 to the off position.

21. Press CH30-3/IN0-3 to the on position.

22. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

23. Press CH30-3/IN0-3 to the off position.

24. Press CH30-4/IN0-4 to the on position.

25. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

26. Press CH30-4/IN0-4 to the off position.

27. Press CH30-5/IN0-5 to the on position.

28. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

29. Press CH30-5/IN0-5 to the off position.

30. Press CH30-6/IN0-6 to the on position.

31. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

32. Press CH30-6/IN0-6 to the off position.

33. Press CH30-7/IN0-7 to the on position.

34. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

35. Press CH30-7/IN0-7 to the off position.

36. Press CH30-8/IN0-8 to the on position.

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37. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

38. Press CH30-8/IN0-8 to the off position.

39. Press CH30-9/IN0-9 to the on position.

40. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

41. Press CH30-9/IN0-9 to the off position.

42. Press CH30-10/IN0-10 to the on position.

43. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

44. Press CH30-10/IN0-10 to the off position.

45. Press CH30-11/IN0-11 to the on position.

46. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

47. Press CH30-11/IN0-11 to the off position.

48. Press CH30-12/IN0-12 to the on position.

49. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

50. Press CH30-12/IN0-12 to the off position.

51. Press CH30-13/IN0-13 to the on position.

52. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

53. Press CH30-13/IN0-13 to the off position.

54. Press CH30-14/IN0-14 to the on position.

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55. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

56. Press CH30-14/IN0-14 to the off position.

57. Press CH30-15/IN0-15 to the on position.

58. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

59. Press CH30-15/IN0-15 to the off position.

60. Press CH31-1/IN2-1 to the on position.

61. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

62. Press CH31-1/IN2-1 to the off position.

63. Press CH31-2/IN2-2 to the on position.

64. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

65. Press CH31-2/IN2-2 to the off position.

66. Press CH31-3/IN2-3 to the on position.

67. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

68. Press CH31-3/IN2-3 to the off position.

69. Press CH31-4/IN2-4 to the on position.

70. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

71. Press CH31-4/IN2-4 to the off position.

72. Press CH31-5/IN2-5 to the on position.

73. Verify that the following displays occur

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

74. Press CH31-5/IN2-5 to the off position.

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75. Press CH31-6/IN2-6 to the on position.

76. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

77. Press CH31-6/IN2-6 to the off position.

78. Press CH31-7/IN2-7 to the on position.

79. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

80. Press CH31-7/IN2-7 to the off position.

81. Press CH31-8/IN2-8 to the on position.

82. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

83. Press CH31-8/IN2-8 to the off position.

84. Press CH31-9/IN2-9 to the on position.

85. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

86. Press CH31-9/IN2-9 to the off position.

87. Press CH31-10/IN2-10 to the on position.

88. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

89. Press CH31-10/IN2-10 to the off position.

90. Press CH31-11/IN2-11 to the on position.

91. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

92. Press CH31-11/IN2-11 to the off position.

93. Press CH31-12/IN2-12 to the on position.

94. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

95. Press CH31-12/IN2-12 to the off position.

96. Press CH31-13/IN2-13 to the on position.

97. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

98. Press CH31-13/IN2-13 to the off position.

99. Press CH31-14/IN2-14 to the on position.

100. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

101. Press CH31-14/IN2-14 to the off position.

102. Press CH31-15/IN2-15 to the on position.

103. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

104. Press CH31-15/IN2-15 to the off position.

105. Press CH32-1/IN3-1 to the on position.

106. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

107. Press CH32-1/IN3-1 to the off position.

108. Press CH32-2/IN3-2 to the on position.

109. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

110. Press CH32-2/IN3-2 to the off position.

111. Press CH32-3/IN3-3 to the on position.

112. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

113. Press CH32-3/IN3-3 to the off position.

114. Press CH32-4/IN3-4 to the on position.

115. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

116. Press CH32-4/IN3-4 to the off position.

117. Press CH32-5/IN3-5 to the on position.

118. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

119. Press CH32-5/IN3-5 to the off position.

120. Press CH32-6/IN3-6 to the on position.

121. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

122. Press CH32-6/IN3-6 to the off position.

123. Press CH32-7/IN3-7 to the on position.

124. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

125. Press CH32-7/IN3-7 to the off position.

126. Press CH32-8/IN3-8 to the on position.

127. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

128. Press CH32-8/IN3-8 to the off position.

129. Press CH32-9/IN3-9 to the on position.

130. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

131. Press CH32-9/IN3-9 to the off position.

132. Press CH32-10/IN3-10 to the on position.

133. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and then revert to normal program monitoring.

134. Press CH32-10/IN3-10 to the off position.

135. Set the register select switch to the L position.

136. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this section of the test has been successfully completed. Stamp data sheet and proceed to step 139 of this JDC.

137. Set the T12 COUNTER STOP switch to the on position.

138. Starting with step 7, perform the procedures of this JDC again. If the failure occurs again discontinue further testing.

PROGRAM ANALYSIS - DSKY SPACECRAFT SIGNALS

This program exercises the DSKY Relays which transmit discrete signals to the spacecraft. This section of the ALLEREST program is composed of 12 test exercises which activate certain DSKY Relays in turn producing a visual indication on the MAIN and NAV DSKY sections of the CTS Interface panel. Tests are performed incrementally with the program pausing at the conclusion of each test to signal the operator with the COMP ACTY light that it is waiting to perform the next test. The operator allows the next test to be performed by pressing Bit 1 of Channel 30 (RDC Interface) twice. Bit 1 of Channel 30 is an alternate action switch which is off initially. On the first actuation Bit 1 is turned on allowing the program to extinguish COMP ACTY. Then the program waits for the next (off) actuation of Bit 1. When Bit 1 is switched off the program will perform the next test. The first set of procedures described under 1 below are concerned with initialization procedures.

1. Program Initialization Routine

a. Turns on DSKY RESTART (Bit 10, Channel 11) light.

b. Switches to ALRMOFF (Location 1465) which in sequence performs the following:

1. Load 60000 into Channel 10, turning off DSKY indicators PROGRAM, TRACKER, GIMBAL LOCK, NO ATT, and, in those systems which contain the lights, ALT, VEL, and 2 SPARES.

2. Stores return address (Q) in 0112.

3. Writes PZ (positive zero) into Channels 12, 13, and 33.

4. Reads and Masks Bit 14 of Channel 33 (WARNING light).

5. Tests bit 14 for the off condition. If it is on, the program will turn on the OPERATOR ERROR light (Channel 11, Bit 7) to indicate to the operator that the AGC WARNING is set. The program will then go back and read Channel 33 again and check for bit 14 for the off condition. If the AGC WARNING is off, the program will load PZ into Channel 11 and continue the program.

6. Switches back to the return address as stored in 0112.

c. Loads PZ into the Index location (TESEL).

d. Switches out to COMPON (location 1515) where it writes 00002 into Channel 11 turning on the COMP ACTY light.

The COMPON and ALRM OFF subroutines are used as integral portions of the test routine described below. The program procedures described under 2 are valid for any test being performed in this section with the only difference being the end result, i. e., the actual indicators illuminated on the DSKY and on the XY Interface panel of the CTS.

2. Program Testing Routine

a. Turn on COMP ACTY. Read Channel 30 and Mask with Bit one and test results with a CCS.

b. If the operator has not pushed the button the program stays in a loop which continues to RDCH30 and test for the anticipated switch actuation.

c. When the switch (Bit 1 CH30) is actuated the program switches to the ALRM OFF subroutine resetting the COMP ACTY light and again checks for AGC WARNING (Channel 33, Bit 14) off condition.

d. The program then switches back to the main program and the next instruction is another RDCH30. Channel 30 is read and Masked with bit one and tested with another CCS instruction (at 1414), but this time the test is for a POSITIVE NON-ZERO accumulator, indicating that the operator has de-energized Bit of CH30.

e. The CCS instruction above switches the program to an Index (location 1542) instruction. The Index location (TESEL) in combination with the TC (to 1525) to the test table (TSTAB) instruction provides a switch which selects the next test (in sequence) from the table.

f. TSTAB will switch the program into the proper test subroutine which will set up the DSKY Relay word to illuminate the specified indicators.

g. After the indicators have been turned on the program will increment TESEL (Index) so that the next location in the test table will be selected after the operator repeats the on-off switching sequence of Bit 1 Channel 30. The program will loop back to (a) above and repeat (a) through (g) for the next test sequence.

There is no success display provided at the end of this particular section of the ALLEREST. The test will be completed successfully if all of the indicators and alarms specified in the steps below illuminate and extinguish in accordance with the procedure.

139. Set the T12 COUNTER STOP switch to the ON position.

140. Transfer Control to E Bank 4, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

141. Press RDC Interface switch CH30-15/IN0-15 to the on (illuminated) position. Verify TEMP alarm indicator on DSKY turns off.

142. Press the MONITOR indicator switch to the on (illuminated) position.

143. Press the CL Key.

144. Set switches INHIBIT INCREMENTS and T12 COUNTER STOP to the OFF position.

145. Press the PROCEED button, then the ALARM RESET button.

146. When the COMP ACT light (after a delay of approximately 10 seconds) appears on either DSKY, verify the following:

a. All lights are OFF in the MAIN DSKY section of the XY Interface Panel.

b. All lights are OFF in the NAV DSKY section of the XY Interface Panel.

c. All alarm lights on the DSKY are OFF.

NOTE: RDC Interface switch CH30-1 is an alternate action indicator switch which is illuminated in the on state and extinguished in the off state. When performing any steps which require CH30-1 to be turned on and off, allow an approximate 3 second delay between switch actuations. Omit NAV DSKY callouts in the following steps if this procedure is being performed during LM CSS checkout.

147. Press the CH30-1 on and then off.

148. On either DSKY verify that the COMP ACTY light is ON.

149. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M37, M42, N25, and N30.

150. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

151. Press CH30-1 OFF.

152. On either DSKY verify that the COMP ACTY light is on.

153. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M34 and N20.

154. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

155. Press CH30-1 OFF.

156. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M36 and N19.

157. On either DSKY verify that the COMP ACTY light is ON.

158. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

159. Press CH30-1 OFF.

160. On either DSKY verify that the COMP ACTY light is ON and blank. If a LEM DSKY is being tested, verify that the ALT light is ON.

161. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M41 and N29.

162. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

163. Press CH30-1 OFF.

164. On either DSKY verify that the COMP ACTY and GIMBAL LOCK lights are ON.

165. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

166. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

167. Press CH30-1 OFF.

168. On either DSKY verify that the COMP ACTY light is ON.

169. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M31 and N21.

170. Press CH30-1 ON and verify that the lights of the two preceding steps go OFF.

171. Press CH30-1 OFF.

172. On either DSKY verify that the COMP ACTY and TRACKER lights are ON.

173. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

174. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

175. Press CH30-1 OFF.

176. On either DSKY verify that the COMP ACTY and PROGRAM lights are ON.

177. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

178. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

179. Press CH30-1 OFF.

180. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

181. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

182. Press CH30-1 ON and verify the lights of the two preceding steps go OFF.

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183. Press CH30-15 and CH30-1 OFF.

184. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

185. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

186. Press CH30-15 and CH30-1 ON and verify that the lights of the two preceding steps go OFF.

187. Press CH30-1 OFF.

188. On either DSKY verify that the COMP ACTY, STBY and RESTART lights are ON.

189. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M32, M38, M39 and M40 N22, N26, N27 and N28.

190. Press CH30-1 ON.

191. Press ALARM RESET.

192. When the COMP ACTY light goes OFF, verify that all lights on the DSKY section of the XY Interface Panel are OFF.

193. Press CH30-1 OFF.

194. Set T12 and INHIBIT INCREMENT switches ON.

195. Stamp data sheet if the test was successfully completed. If a failure occurred during this test repeat all steps starting with step 140. If a second failure occurs, discontinue further testing.

PROGRAM ANALYSIS - DSKY DISPLAY

The DSKY Test is a fully automatic test routine which starts in Bank 5, Location 1400 and is applicable to both DSKY's. The sequence of program functions are performed in the order listed below.

NOTE: DSKY indicators listed below marked with * are applicable only for LM flight and LM flight spare DSKY's.

a. Clears all DSKY Indicators and Display Registers.

b. Lights DSKY Indicators one at a time in the order listed below:

1. UPLINK
*2. SPARE
*3. SPARE
*4. VEL
5. NO ATT
6. KEY RELEASE (Flashing)
7. TEMP
8. GIMBAL LOCK
9. PROG
10. TRACKER
*11. ALT
12. OPR ERR (Flashing)

c. Lights DSKY Indicators RESTART and STBY together.

d. Lights entire panel with KEY REL and OPR ERR flashing.

e. Turns on DSKY COMP ACTY indicator. (This indicator will remain on for the DSKY Register test.)

f. Writes +00000 into DSKY Registers 1, 2, and 3 and flashes 00 in the VERB and NOUN displays and non-flashing 00 in the PROGRAM display.

g. Writes -11111 into DSKY Registers 1, 2, and 3 and flashes 11 in the VERB and NOUN displays and non-flashing 11 in the PROGRAM display.

h. Writes +22222 into DSKY Registers 1, 2, and 3 and flashes 22 in the VERB and NOUN displays and non-flashing 22 in the PROGRAM display.

i. Writes -33333 into DSKY Registers 1, 2, and 3 and flashes 33 in the VERB and NOUN displays and non-flashing 33 in the PROGRAM display.

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j. Writes +44444 into DSKY Registers 1, 2, and 3 and flashes 44 in the VERB and NOUN displays and non-flashing 44 in the PROGRAM display.

k. Writes -55555 into DSKY Registers 1, 2, and 3 and flashes 55 in the VERB and NOUN displays and non-flashing 55 in the PROGRAM display.

l. Writes +66666 into DSKY Registers 1, 2, and 3 and flashes 66 in the VERB and NOUN displays and non-flashing 66 in the PROGRAM display.

m. Writes -77777 into DSKY Registers 1, 2, and 3 and flashes 77 in the VERB and NOUN displays and non-flashing 77 in the PROGRAM display.

n. Writes +88888 into DSKY Registers 1, 2, and 3 and flashes 88 in the VERB and NOUN displays and non-flashing 88 in the PROGRAM display.

o. Writes -99999 into DSKY Registers 1, 2, and 3 and flashes 99 in the VERB and NOUN displays and non-flashing 99 in the PROGRAM display.

p. Displays 70707 alternating with 07070 on the REG SEL display (with register select switch set to L). This display will be presented for 15 seconds, after which time the entire test will automatically repeat. The T12 COUNTER STOP switch should be set to the ON position during this display, so that all DSKY displays will be in the clear condition at the conclusion of testing. Success or failure of this test is determined visually by the operator noting that all displays occur as specified.

196. Transfer Control to E Bank 5, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

197. Press the MONITOR indicator switch to the on (illuminated) position and set the register select switch to the L position.

198. Press the CL Key.

199. Set the T12 COUNTER STOP switch to the OFF position.

200. Set the INHIBIT INCREMENTS switch to the OFF position.

201. Press the PROCEED button.

202. Verify that the DSKY UPLINK ACTY indicator turns on.

NOTE: DSKY indicators listed below marked with * are applicable only for LM flight and LM flight spare DSKY's.

203. Verify that DSKY indicator:
UPLINK ACTY turns off
*BLANK (SCREEN) turns on

204. Verify that DSKY indicator:
*BLANK (SCREEN) turns off
*BLANK (SCREEN) turns on

205. Verify that DSKY indicator:
*BLANK (SCREEN) turns off
*VEL turns on

206. Verify that DSKY indicator:
*VEL turns off
NO ATT turns on

207. Verify that DSKY indicator:
NO ATT turns off
KEY REL turns on and is flashing

208. Verify that DSKY indicator:
KEY REL turns off
TEMP turns on

209. Verify that DSKY indicator:
TEMP turns off
GIMBAL LOCK turns on

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210. Verify that DSKY indicator:
GIMBAL LOCK turns off
PROG turns on

211. Verify that DSKY indicator:
PROG turns off
TRACKER turns on

212. Verify that DSKY indicator:
TRACKER turns off
*ALT turns on

213. Verify that DSKY indicator:
*ALT turns off
OPR ERR turns on and is flashing

214. Verify that DSKY indicator:
OPR ERR turns off
RESTART and STBY turn on together

215. Verify that all of the DSKY indicators mentioned above, are on with the KEY REL and OPR ERR indicators flashing.

216. Verify that the DSKY COMP ACTY indicator turns on. This indicator should remain on for the rest of the test.

217. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +00000
Register 2 = +00000
Register 3 = +00000
VERB = 00 (Flashing)
NOUN = 00 (Flashing)
PROGRAM = 00

218. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -11111
Register 2 = -11111
Register 3 = -11111
VERB = 11 (Flashing)
NOUN = 11 (Flashing)
PROGRAM = 11

219. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +22222
Register 2 = +22222
Register 3 = +22222
VERB = 22 (Flashing)
NOUN = 22 (Flashing)
PROGRAM = 22

220. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -33333
Register 2 = -33333
Register 3 = -33333
VERB = 33 (Flashing)
NOUN = 33 (Flashing)
PROGRAM = 33

221. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +44444
Register 2 = +44444
Register 3 = +44444
VERB = 44 (Flashing)
NOUN = 44 (Flashing)
PROGRAM = 44

222. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -55555
Register 2 = -55555
Register 3 = -55555
VERB = 55 (Flashing)
NOUN = 55 (Flashing)
PROGRAM = 55

223. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +66666
Register 2 = +66666
Register 3 = +66666
VERB = 66 (Flashing)
NOUN = 66 (Flashing)
PROGRAM = 66

224. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -77777
Register 2 = -77777
Register 3 = -77777
VERB = 77 (Flashing)
NOUN = 77 (Flashing)
PROGRAM = 77

225. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +88888
Register 2 = +88888
Register 3 = +88888
VERB = 88 (Flashing)
NOUN = 88 (Flashing)
PROGRAM = 88

226. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -99999
Register 2 = -99999
Register 3 = -99999
VERB = 99 (Flashing)
NOUN = 99 (Flashing)
PROGRAM = 99

227. Verify that the DSKY display is clear, and the REG SEL display is 70707 alternating with 07070. Set the T12 COUNTER STOP switch to the ON position immediately after verifying the REG SEL display. If a failure was observed during this test, do not turn ON the T12 COUNTER STOP switch. Allow the test program to recycle twice, and if the malfunction is still present, discontinue further testing. Stop the computer coincident with the REG SEL display, as described above.

228. Set the INHIBIT INCREMENT switch to the ON position.

229. Press the FRESH START button. Verify RESTART alarm indicator on DSKY turns on. Stamp data sheet if test was successful.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05783 JDC
REV. H
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
136.	Channels 30, 31, and 32 test (steps 7 through 136) completed successfully.		
195.	DSKY Spacecraft Signals (steps 139 through 195) completed successfully.		
—▷ 226.	DSKY Display test (steps 196 through 225) completed successfully.		

JOB OPERATING PROCEDURE FOR (FVP)
PROGRAM-ALLEREST

JDC 05783 REV. — PAGE 1 OF 17
INITIAL TDRR 32809 D.S. PGS 1

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

Program ALLEREST contains three separate tests, the first of which tests the operation of Channels 30, 31, and 32. The next test checks the operation of the DSKY relays used to transmit signals to the spacecraft. The last test checks the operation of the DSKY Indicators and Display Registers. It is recommended that the Program Analysis sections of this JDC be reviewed prior to testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program ALLEREST
Mylar Tape, JDC 05784

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

> NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the RDC Interface panel of the CTS.

3. Load PROGRAM ALLEREST (JDC 05784) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

> NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407, Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

PROGRAM ANALYSIS - CHANNELS 30, 31, AND 32

The programmed functions of this portion of the test checks that Channels 30, 31, and 32 receive DC signals in the proper bit positions via the Interface Module. Initially, the Program verifies that all the Bit Positions of Channels 30, 31, and 32 are de-energized. When this check is successfully completed,

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

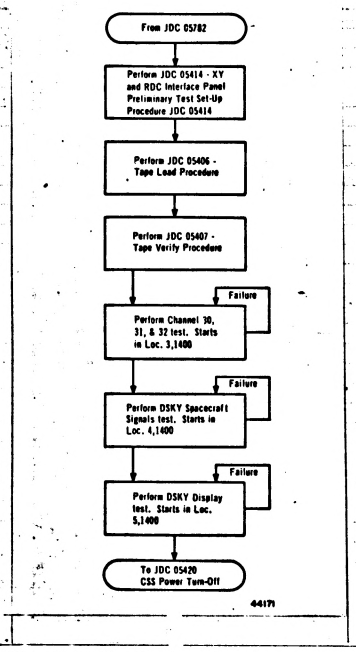
From JDC 05782
Perform JDC 05414 - XY and RDC Interface Panel Preliminary Test Set-Up Procedure JDC 05414
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 - Tape Verify Procedure
Failure
Perform Channel 30, 31, & 32 test. Starts in Loc. 3,1400
Failure
Perform DSKY Spacecraft Signals test. Starts in Loc. 4,1400
Failure
Perform DSKY Display test. Starts in Loc. 5,1400
To JDC 05420 CSS Power Turn-Off
44171

Figure 1. Flowchart for Performing Program ALLEREST

DATE ______

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the Program will turn off the DSKY COMP ACTY indicator. Extinguishing COMP ACTY is a signal to the operator to start the switching sequence at the RDC Panel, beginning with CH30-1.

At this point and throughout the remainder of the switching sequence the Program looks for a switch to be energized. When the Program detects an actuation it enters a routine to determine that it was the proper switch, and checks the other two Channels to make sure that they do not have bits present. If no discrepancies are noted during these checks, the Computer will turn on the DSKY COMP ACTY indicator, and Register A will present a five second flashing display. (All bits will flash except the one under test.) At the end of this period the Program will turn off the DSKY COMP ACTY indicator signaling the operator to de-energize the switch just tested and energize the next switch to the left (in this case CH30-2). During the test the number of the Channel under test will appear in the DSKY VERB display.

When one Channel has been completely tested, the test is continued by actuating switch number one of the next Channel. The last switch energized in the sequence is CH32-10. After this Bit is tested the Program will switch to the success routine which will be displayed on Register L as 70707 alternating with 07070.

The DSKY indications used in this test and their interpretation are listed below.

NO ATT	Operator failed to energize the next test bit within one minute of completion of testing of last bit.
KEY RELEASE	Two adjacent switches are energized together for 30 seconds. This situation occurs when the operator energizes the switch to be tested before he de-energized the previous switch which was just checked.
HOLD	Hardware Failure. Detection of an improper bit in CH30, 31, or 32 will be displayed on the DSKY as follows:

Noun - Channel where error was detected

Register 1 - Octal display of CH30

Register 2 - Octal display of CH31

Register 3 - Octal display of CH32

If any error condition occurs the operator Transfers Control back to location 3, 1400 and reruns the test again. If the error resulted from improper operation of the Hardware under test, and a second error occurs, discontinue further testing.

7. Transfer Control to Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

8. Press the MONITOR indicator switch to the on (illuminated) position.

9. Press the CL Key.

10. Set the T12 COUNTER STOP switch to the OFF position.

11. Set the INHIBIT INCREMENTS switch to the OFF position.

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12. Press the PROCEED button.

13. Verify that the DSKY COMP ACTY indicator switches off.

> NOTE: CH30, 31, and 32 are alternate-action indicator switches which are illuminated in the energized position. To turn on any switch press to the illuminated position. To turn off any switch press to the extinguished position.

14. If an error condition occurs in any part of this test, periorm steps 140 and 141.

15. Press CH30-1/IN0-1 to the on (illuminated) position.

16. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

17. Press CH30-1/IN0-1 to the off position.

18. Press CH30-2/IN0-2 to the on position.

19. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

20. Press CH30-2/IN0-2 to the off position.

21. Press CH30-3/IN0-3 to the on position.

22. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

23. Press CH30-3/IN0-3 to the off position.

24. Press CH30-4/IN0-4 to the on position.

25. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

26. Press CH30-4/IN0-4 to the off position.

27. Press CH30-5/IN0-5 to the on position.

28. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

    b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and turns off.

29. Press CH30-5/IN0-5 to the off position.

30. Press CH30-6/IN0-6 to the on position.

31. Verify that the following displays occur:

    a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

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OPERATING PROCEDURE FOR (FVP)
JOB PROGRAM-ALLEREST

JDC 05783 REV. — PAGE 1 OF 17
INITIAL TDRR 32809 D.S. PGS 1

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

Program ALLEREST contains three separate tests, the first of which tests the operation of Channels 30, 31, and 32. The next test checks the operation of the DSKY relays used to transmit signals to the spacecraft. The last test checks the operation of the DSKY Indicators and Display Registers. It is recommended that the Program Analysis sections of this JDC be reviewed prior to testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC's 05406, 05407, 05412, 05413, 05414
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL Program ALLEREST Mylar Tape, JDC 05784

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

2. Perform the XY and RDC Interface Panel Preliminary Test Set-Up Procedure, JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the RDC Interface panel of the CTS.

3. Load PROGRAM ALLEREST (JDC 05784) into the Computer via the CTS using the procedures of JDC 05406 (Tape Load Operating Procedure).

NOTE: The procedures of this JDC are also shown in the Flowchart of Figure 1.

4. Rewind Tape.

5. Verify that the Program has been properly loaded into memory by performing JDC 05407, Tape Verify Operating Procedure.

6. Press the TAPE FREE RUN indicator switch to the off (extinguished) position.

OPERATION

PROGRAM ANALYSIS - CHANNELS 30, 31, AND 32

The programmed functions of this portion of the test checks that Channels 30, 31, and 32 receive DC signals in the proper bit positions via the Interface Module. Initially, the Program verifies that all the Bit Positions of Channels 30, 31, and 32 are de-energized. When this check is successfully completed,

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

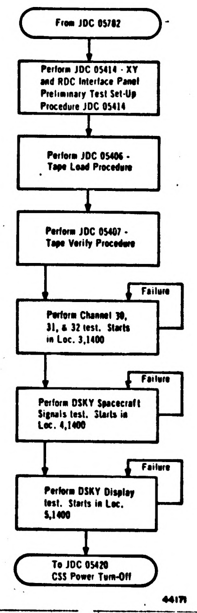
From JDC 05782
Perform JDC 05414 - XY and RDC Interface Panel Preliminary Test Set-Up Procedure JDC 05414
Perform JDC 05406 - Tape Load Procedure
Perform JDC 05407 - Tape Verify Procedure
Failure
Perform Channel 30, 31, & 32 test. Starts in Loc. 3,1400
Failure
Perform DSKY Spacecraft Signals test. Starts in Loc. 4,1400
Failure
Perform DSKY Display test. Starts in Loc. 5,1400
To JDC 05420 CSS Power Turn-Off
44171

Figure 1. Flowchart for Performing Program ALLEREST

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the Program will turn off the DSKY COMP ACTY indicator. Extinguishing COMP ACTY is a signal to the operator to start the switching sequence at the RDC Panel, beginning with CH30-1.

At this point and throughout the remainder of the switching sequence the Program looks for a switch to be energized. When the Program detects an actuation it enters a routine to determine that it was the proper switch, and checks the other two Channels to make sure that they do not have bits present. If no discrepancies are noted during these checks, the Computer will turn on the DSKY COMP ACTY indicator, and Register A will present a five second flashing display. (All bits will flash except the one under test.) At the end of this period the Program will turn off the DSKY COMP ACTY indicator signaling the operator to de-energize the switch just tested and energize the next switch to the left (in this case CH30-2). During the test the number of the Channel under test will appear in the DSKY VERB display.

When one Channel has been completely tested, the test is continued by actuating switch number one of the next Channel. The last switch energized in the sequence is CH32-10. After this Bit is tested the Program will switch to the success routine which will be displayed on Register L as 70707 alternating with 07070.

The DSKY indications used in this test and their interpretation are listed below.

NO ATT — Operator failed to energize the next test bit within one minute of completion of testing of last bit.

KEY RELEASE — Two adjacent switches are energized together for 30 seconds. This situation occurs when the operator energizes the switch to be tested before he de-energized the previous switch which was just checked.

HOLD — Hardware Failure. Detection of an improper bit in CH30, 31, or 32 will be displayed on the DSKY as follows:

Noun - Channel where error was detected

Register 1 - Octal display of CH30

Register 2 - Octal display of CH31

Register 3 - Octal display of CH32

If any error condition occurs the operator Transfers Control back to location 3, 1400 and reruns the test again. If the error resulted from improper operation of the Hardware under test, and a second error occurs, discontinue further testing.

7. Transfer Control to Bank 3, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

8. Press the MONITOR indicator switch to the on (illuminated) position.

9. Press the CL Key.

10. Set the T12 COUNTER STOP switch to the OFF position.

11. Set the INHIBIT INCREMENTS switch to the OFF position.

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12. Press the PROCEED button.

13. Verify that the DSKY COMP ACTY indicator switches off.

NOTE: CH30, 31, and 32 are alternate-action indicator switches which are illuminated in the energized position. To turn on any switch press to the illuminated position. To turn off any switch press to the extinguished position.

14. If an error condition occurs in any part of this test, perform steps 140 and 141.

15. Press CH30-1/IN0-1 to the on (illuminated) position.

16. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

17. Press CH30-1/IN0-1 to the off position.

18. Press CH30-2/IN0-2 to the on position.

19. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

20. Press CH30-2/IN0-2 to the off position.

21. Press CH30-3/IN0-3 to the on position.

22. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

23. Press CH30-3/IN0-3 to the off position.

24. Press CH30-4/IN0-4 to the on position.

25. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

26. Press CH30-4/IN0-4 to the off position.

27. Press CH30-5/IN0-5 to the on position.

28. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and turns off.

29. Press CH30-5/IN0-5 to the off position.

30. Press CH30-6/IN0-6 to the on position.

31. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

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b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

32. Press CH30-6/IN0-6 to the off position.

33. Press CH30-7/IN0-7 to the on position.

34. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

35. Press CH30-7/IN0-7 to the off position.

36. Press CH30-8/IN0-8 to the on position.

37. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

38. Press CH30-8/IN0-8 to the off position.

39. Press CH30-9/IN0-9 to the on position.

40. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

41. Press CH30-9/IN0-9 to the off position.

42. Press CH30-10/IN0-10 to the on position.

43. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

44. Press CH30-10/IN0-10 to the off position.

45. Press CH30-11/IN0-11 to the on position.

46. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

47. Press CH30-11/IN0-11 to the off position.

48. Press CH30-12/IN0-12 to the on position.

49. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

50. Press CH30-12/IN0-12 to the off position.

51. Press CH30-13/IN0-13 to the on position.

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52. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

53. Press CH30-13/IN0-13 to the off position.

54. Press CH30-14/IN0-14 to the on position.

55. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

56. Press CH30-14/IN0-14 to the off position.

57. Press CH30-15/IN0-15 to the on position.

58. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

59. Press CH30-15/IN0-15 to the off position.

60. Press CH31-1/IN2-1 to the on position.

61. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

62. Press CH31-1/IN2-1 to the off position.

63. Press CH31-2/IN2-2 to the on position.

64. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

65. Press CH31-2/IN2-2 to the off position.

66. Press CH31-3/IN2-3 to the on position.

67. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

68. Press CH31-3/IN2-3 to the off position.

69. Press CH31-4/IN2-4 to the on position.

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70. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

71. Press CH31-4/IN2-4 to the off position.

72. Press CH31-5/IN2-5 to the on position.

73. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

74. Press CH31-5/IN2-5 to the off position.

75. Press CH31-6/IN2-6 to the on position.

76. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

77. Press CH31-6/IN2-6 to the off position.

78. Press CH31-7/IN2-7 to the on position.

79. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

80. Press CH31-7/IN2-7 to the off position.

81. Press CH31-8/IN2-8 to the on position.

82. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

83. Press CH31-8/IN2-8 to the off position.

84. Press CH31-9/IN2-9 to the on position.

85. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

86. Press CH31-9/IN2-9 to the off position.

87. Press CH31-10/IN2-10 to the on position.

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88. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

89. Press CH31-10/IN2-10 to the off position.

90. Press CH31-11/IN2-11 to the on position.

91. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

92. Press CH31-11/IN2-11 to the off position.

93. Press CH31-12/IN2-12 to the on position.

94. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

95. Press CH31-12/IN2-12 to the off position.

96. Press CH31-13/IN2-13 to the on position.

97. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

98. Press CH31-13/IN2-13 to the off position.

99. Press CH31-14/IN2-14 to the on position.

100. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

101. Press CH31-14/IN2-14 to the off position.

102. Press CH31-15/IN2-15 to the on position.

103. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

104. Press CH31-15/IN2-15 to the off position.

105. Press CH32-1/IN3-1 to the on position.

106. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

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b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

32. Press CH30-6/IN0-6 to the off position.

33. Press CH30-7/IN0-7 to the on position.

34. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

35. Press CH30-7/IN0-7 to the off position.

36. Press CH30-8/IN0-8 to the on position.

37. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

38. Press CH30-8/IN0-8 to the off position.

39. Press CH30-9/IN0-9 to the on position.

40. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

41. Press CH30-9/IN0-9 to the off position.

42. Press CH30-10/IN0-10 to the on position.

43. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

44. Press CH30-10/IN0-10 to the off position.

45. Press CH30-11/IN0-11 to the on position.

46. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

47. Press CH30-11/IN0-11 to the off position.

48. Press CH30-12/IN0-12 to the on position.

49. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

50. Press CH30-12/IN0-12 to the off position.

51. Press CH30-13/IN0-13 to the on position.

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52. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

53. Press CH30-13/IN0-13 to the off position.

54. Press CH30-14/IN0-14 to the on position.

55. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

56. Press CH30-14/IN0-14 to the off position.

57. Press CH30-15/IN0-15 to the on position.

58. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

59. Press CH30-15/IN0-15 to the off position.

60. Press CH31-1/IN2-1 to the on position.

61. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

62. Press CH31-1/IN2-1 to the off position.

63. Press CH31-2/IN2-2 to the on position.

64. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

65. Press CH31-2/IN2-2 to the off position.

66. Press CH31-3/IN2-3 to the on position.

67. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

68. Press CH31-3/IN2-3 to the off position.

69. Press CH31-4/IN2-4 to the on position.

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70. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

71. Press CH31-4/IN2-4 to the off position.

72. Press CH31-5/IN2-5 to the on position.

73. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

74. Press CH31-5/IN2-5 to the off position.

75. Press CH31-6/IN2-6 to the on position.

76. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

77. Press CH31-6/IN2-6 to the off position.

78. Press CH31-7/IN2-7 to the on position.

79. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

80. Press CH31-7/IN2-7 to the off position.

81. Press CH31-8/IN2-8 to the on position.

82. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

83. Press CH31-8/IN2-8 to the off position.

84. Press CH31-9/IN2-9 to the on position.

85. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

86. Press CH31-9/IN2-9 to the off position.

87. Press CH31-10/IN2-10 to the on position.

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88. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

89. Press CH31-10/IN2-10 to the off position.

90. Press CH31-11/IN2-11 to the on position.

91. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

92. Press CH31-11/IN2-11 to the off position.

93. Press CH31-12/IN2-12 to the on position.

94. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 12 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

95. Press CH31-12/IN2-12 to the off position.

96. Press CH31-13/IN2-13 to the on position.

97. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 13 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

98. Press CH31-13/IN2-13 to the off position.

99. Press CH31-14/IN2-14 to the on position.

100. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds and turns off.

b. Bit 14 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

101. Press CH31-14/IN2-14 to the off position.

102. Press CH31-15/IN2-15 to the on position.

103. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 15 and 16 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

104. Press CH31-15/IN2-15 to the off position.

105. Press CH32-1/IN3-1 to the on position.

106. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 1 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

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107. Press CH32-1/IN3-1 to the off position.

108. Press CH32-2/IN3-2 to the on position.

109. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

110. Press CH32-2/IN3-2 to the off position.

111. Press CH32-3/IN3-3 to the on position.

112. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

113. Press CH32-3/IN3-3 to the off position.

114. Press CH32-4/IN3-4 to the on position.

115. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

116. Press CH32-4/IN3-4 to the off position.

117. Press CH32-5/IN3-5 to the on position.

118. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

119. Press CH32-5/IN3-5 to the off position.

120 Press CH32-6/IN3-6 to the on position.

121. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

122. Press CH32-6/IN3-6 to the off position.

123. Press CH32-7/IN3-7 to the on position.

124. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

125. Press CH32-7/IN3-7 to the off position.

126. Press CH32-8/IN3-8 to the on position.

127. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

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b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

128. Press CH32-8/IN3-8 to the off position.

129. Press CH32-9/IN3-9 to the on position.

130. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

131. Press CH32-9/IN3-9 to the off position.

132. Press CH32-10/IN3-10 to the on position.

133. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

134. Press CH32-10/IN3-10 to the off position.

135. Press CH32-11/IN3-11 to the on position.

136. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

137. Press CH32-11/IN3-11 to the off position.

138. Set the register select switch to the L position.

139. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this section of the test has been successfully completed. Stamp data sheet and proceed to step 142 of this JDC.

140. Set the T12 COUNTER STOP switch to the on position.

141. Starting with step 7, perform the procedures of this JDC again. If the failure occurs again discontinue further testing.

PROGRAM ANALYSIS - DSKY SPACECRAFT SIGNALS

This program exercises the DSKY Relays which transmit discrete signals to the spacecraft. This section of the ALLEREST program is composed of 12 test exercises which activate certain DSKY Relays in turn producing a visual indication on the MAIN and NAV DSKY sections of the CTS Interface panel. Tests are performed incrementally with the program pausing at the conclusion of each test to signal the operator with the COMP ACTY light that it is waiting to perform the next test. The operator allows the next test to be performed by pressing Bit 1 of Channel 30 (RDC Interface) twice. Bit 1 of Channel 30 is an alternate action switch which is off initially. On the first actuation Bit 1 is turned on allowing the program to extinguish COMP ACTY. Then the program waits for the next (off) actuation of Bit 1. When Bit 1 is switched off the program will perform the next test. The first set of procedures described under 1 below are concerned with initialization procedures.

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1. Program Initialization Routine

a. Turns on DSKY RESTART (Bit 10, Channel 11) light.

b. Switches to ALRMOFF (Location 1465) which in sequence performs the following:

1. Load 60000 into Channel 10, turning off DSKY indicators PROGRAM, TRACKER, GIMBAL LOCK, NO ATT, FREE HOLD, and AUTO.

2. Stores return address (Q) in 0112.

3. Writes PZ (positive zero) into Channels 12, 13, and 33.

4. Reads and Masks Bit 14 of Channel 33 (WARNING light).

5. Tests Bit 14 for the off condition and if true loads PZ into Channel 11 turning off the RESTART light.

6. Switches back to the return address as stored in 0112.

c. Loads PZ into the Index location (TESEL).

d. Switches out to COMPON (location 1515) where it writes 00002 into Channel 11 turning on the COMP ACTY light.

The COMPON and ALRM OFF subroutines are used as integral portions of the test routine described below. The program procedures described under 5 are valid for any test being performed in this section with the only difference being the end result, i.e., the actual indicators illuminated on the DSKY and on the XY Interface panel of the CTS.

2. Program Testing Routine

a. Turn on COMP ACTY. Read Channel 30 and Mask with Bit one and test results with a CCS.

b. If the operator has not pushed the button the program stays in a loop which continues to RDCH30 and test for the anticipated switch actuation.

c. When the switch (Bit 1 CH30) is actuated the program switches to the ALRM OFF subroutine resetting the COMP ACTY light.

d. The program then switches back the main program and the next instruction is another RDCH30. Channel 30 is read and Masked with bit one and tested with another CCS instruction (at 1414), but this time the test is for a PZ (positive zero) accumulator, indicating that the operator has de-energized Bit of CH30.

e. The CCS instruction above switches the program to an Index (location 1512) instruction. The Index location (TESEL) in combination with the TC (to 1525) to the test table (TSTAB) instruction provides a switch which selects the next test (in sequence) from the table.

f. TSTAB will switch the program into the proper test subroutine which will set up the DSKY Relay word to illuminate the specified indicators.

g. After the indicators have been turned on the program will increment TESEL (Index) so that the next location in the test table will be selected after the operator repeats the on-off switching sequence of Bit 1 Channel 30. The program will loop back to (a) above and repeat (a) through (g) for the next test sequence.

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There is no success display provided at the end of this particular section of the ALLEREST. The test will be completed successfully if all of the indicators and alarms specified in the steps below illuminate and extinguish in accordance with the procedure.

142. Set the T12 COUNTER STOP switch to the OFF position.

143. Transfer Control to Bank 4, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

144. Press RDC Interface switch CH30-15/IN0-15 to the on (illuminated) position.

145. Press the MONITOR indicator switch to the on (illuminated) position.

146. Press the CL Key.

147. Set switches INHIBIT INCREMENTS and T12 COUNTER STOP to the OFF position.

148. Press the ALARM RESET button, then the PROCEED button.

149. When the COMP ACT light appears on either DSKY, verify the following:

a. All lights are OFF in the MAIN DSKY section of the XY Interface Panel.

b. All lights are OFF in the NAV DSKY section of the XY Interface Panel.

c. All alarm lights on the DSKY are OFF.

NOTE: RDC Interface switch CH30-1 is an alternate action indicator switch which is illuminated in the on state and extinguished in the off state. When performing any steps which require CH30-1 to be turned on and off, allow an approximate 3 second delay between switch actuations.

150. Press the CH30-1 on and then off.

151. On either DSKY verify that the COMP ACTY light is ON.

152. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M37, M42, N25, and N30.

153. Press CH30-1 ON and verify that the lights of the two proceeding steps go OFF.

154. Press CH30-1 OFF.

155. On either DSKY verify that the COMP ACTY light is on.

156. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M34 and N20.

157. Press CH30-1 ON and verify that the lights of the two preceeding steps go OFF.

158. Press CH30-1 OFF.

159. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M36 and N19.

160. On either DSKY verify that the COMP ACTY light is ON.

161. Press CH30-1 ON and verify that the lights of the two preceeding steps go OFF.

162. Press CH30-1 OFF.

163. On either DSKY verify that the COMP ACTY light is ON.

164. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M41 and N29.

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107. Press CH32-1/IN3-1 to the off position.

108. Press CH32-2/IN3-2 to the on position.

109. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 2 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

110. Press CH32-2/IN3-2 to the off position.

111. Press CH32-3/IN3-3 to the on position.

112. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 3 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

113. Press CH32-3/IN3-3 to the off position.

114. Press CH32-4/IN3-4 to the on position.

115. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 4 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

116. Press CH32-4/IN3-4 to the off position.

117. Press CH32-5/IN3-5 to the on position.

118. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 5 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

119. Press CH32-5/IN3-5 to the off position.

120 Press CH32-6/IN3-6 to the on position.

121. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 6 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

122. Press CH32-6/IN3-6 to the off position.

123. Press CH32-7/IN3-7 to the on position.

124. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 7 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

125. Press CH32-7/IN3-7 to the off position.

126. Press CH32-8/IN3-8 to the on position.

127. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

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b. Bit 8 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

128. Press CH32-8/IN3-8 to the off position.

129. Press CH32-9/IN3-9 to the on position.

130. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 9 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

131. Press CH32-9/IN3-9 to the off position.

132. Press CH32-10/IN3-10 to the on position.

133. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 10 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

134. Press CH32-10/IN3-10 to the off position.

135. Press CH32-11/IN3-11 to the on position.

136. Verify that the following displays occur:

a. DSKY COMP ACTY indicator is on for approximately five seconds, and turns off.

b. Bit 11 of REG SEL register remains on, all other bits flash for approximately five seconds and turn off.

137. Press CH32-11/IN3-11 to the off position.

138. Set the register select switch to the L position.

139. Verify that the REG SEL display is 70707 alternating with 07070 indicating that this section of the test has been successfully completed. Stamp data sheet and proceed to step 142 of this JDC.

140. Set the T12 COUNTER STOP switch to the on position.

141. Starting with step 7, perform the procedures of this JDC again. If the failure occurs again discontinue further testing.

PROGRAM ANALYSIS - DSKY SPACECRAFT SIGNALS

This program exercises the DSKY Relays which transmit discrete signals to the spacecraft. This section of the ALLEREST program is composed of 12 test exercises which activate certain DSKY Relays in turn producing a visual indication on the MAIN and NAV DSKY sections of the CTS Interface panel. Tests are performed incrementally with the program pausing at the conclusion of each test to signal the operator with the COMP ACTY light that it is waiting to perform the next test. The operator allows the next test to be performed by pressing Bit 1 of Channel 30 (RDC Interface) twice. Bit 1 of Channel 30 is an alternate action switch which is off initially. On the first actuation Bit 1 is turned on allowing the program to extinguish COMP ACTY. Then the program waits for the next (off) actuation of Bit 1. When Bit 1 is switched off the program will perform the next test. The first set of procedures described under 1 below are concerned with initialization procedures.

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1. Program Initialization Routine

a. Turns on DSKY RESTART (Bit 10, Channel 11) light.

b. Switches to ALRMOFF (Location 1465) which in sequence performs the following:

1. Load 60000 into Channel 10, turning off DSKY indicators PROGRAM, TRACKER, GIMBAL LOCK, NO ATT, FREE HOLD, and AUTO.

2. Stores return address (Q) in 0112.

3. Writes PZ (positive zero) into Channels 12, 13, and 33.

4. Reads and Masks Bit 14 of Channel 33 (WARNING light).

5. Tests Bit 14 for the off condition and if true loads PZ into Channel 11 turning off the RESTART light.

6. Switches back to the return address as stored in 0112.

c. Loads PZ into the Index location (TESEL).

d. Switches out to COMPON (location 1515) where it writes 00002 into Channel 11 turning on the COMP ACTY light.

The COMPON and ALRM OFF subroutines are used as integral portions of the test routine described below. The program procedures described under 5 are valid for any test being performed in this section with the only difference being the end result, i.e., the actual indicators illuminated on the DSKY and on the XY Interface panel of the CTS.

2. Program Testing Routine

a. Turn on COMP ACTY. Read Channel 30 and Mask with Bit one and test results with a CCS.

b. If the operator has not pushed the button the program stays in a loop which continues to RDCH30 and test for the anticipated switch actuation.

c. When the switch (Bit 1 CH30) is actuated the program switches to the ALRM OFF subroutine resetting the COMP ACTY light.

d. The program then switches back the main program and the next instruction is another RDCH30. Channel 30 is read and Masked with bit one and tested with another CCS instruction (at 14[illegible]4), but this time the test is for a PZ (positive zero) accumulator, indicating that the operator has de-energized Bit of CH30.

e. The CCS instruction above switches the program to an Index (location 1542) instruction. The Index location (TESEL) in combination with the TC (to 1525) to the test table (TSTAB) instruction provides a switch which selects the next test (in sequence) from the table.

f. TSTAB will switch the program into the proper test subroutine which will set up the DSKY Relay word to illuminate the specified indicators.

g. After the indicators have been turned on the program will increment TESEL (Index) so that the next location in the test table will be selected after the operator repeats the on-off switching sequence of Bit 1 Channel 30. The program will loop back to (a) above and repeat (a) through (g) for the next test sequence.

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There is no success display provided at the end of this particular section of the ALLEREST. The test will be completed successfully if all of the indicators and alarms specified in the steps below illuminate and extinguish in accordance with the procedure.

142. Set the T12 COUNTER STOP switch to the OFF position.

143. Transfer Control to Bank 4, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedures).

144. Press RDC Interface switch CH30-15/IN0-15 to the on (illuminated) position.

145. Press the MONITOR indicator switch to the on (illuminated) position.

146. Press the CL Key.

147. Set switches INHIBIT INCREMENTS and T12 COUNTER STOP to the OFF position.

148. Press the ALARM RESET button, then the PROCEED button.

149. When the COMP ACT light appears on either DSKY, verify the following:

a. All lights are OFF in the MAIN DSKY section of the XY Interface Panel.

b. All lights are OFF in the NAV DSKY section of the XY Interface Panel.

c. All alarm lights on the DSKY are OFF.

NOTE: RDC Interface switch CH30-1 is an alternate action indicator switch which is illuminated in the on state and extinguished in the off state. When performing any steps which require CH30-1 to be turned on and off, allow an approximate 3 second delay between switch actuations.

150. Press the CH30-1 on and then off.

151. On either DSKY verify that the COMP ACTY light is ON.

152. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M37, M42, N25, and N30.

153. Press CH30-1 ON and verify that the lights of the two proceeding steps go OFF.

154. Press CH30-1 OFF.

155. On either DSKY verify that the COMP ACTY light is on.

156. On the XY Interface Panel verify that only the following lights are on in the DSKY sections: M34 and N20.

157. Press CH30-1 ON and verify that the lights of the two preceeding steps go OFF.

158. Press CH30-1 OFF.

159. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M36 and N19.

160. On either DSKY verify that the COMP ACTY light is ON.

161. Press CH30-1 ON and verify that the lights of the two preceeding steps go OFF.

162. Press CH30-1 OFF.

163. On either DSKY verify that the COMP ACTY light is ON.

164. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M41 and N29.

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165. Press CH30-1 ON and verify that the lights of the two preceeding steps to OFF.

166. Press CH30-1 OFF.

167. On either DSKY verify that the COMP ACTY and GIMBAL LOCK lights are ON.

168. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

169. Press CH30-1 ON and verify that the lights of the two preceeding steps go OFF.

170. Press CH30-1 OFF.

171. On either DSKY verify that the COMP ACTY light is ON.

172. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M31 and N21.

173. Press CH30-1 ON and verify that the lights of the two preceeding steps go OFF.

174. Press CH30-1 OFF.

175. On either DSKY verify that the COMP ACTY and TRACKER lights are ON.

176. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

177. Press CH30-1 ON and verify the lights of the two preceeding steps go OFF.

178. Press CH30-1 OFF.

179. On either DSKY verify that the COMP ACTY and PROGRAM lights are ON.

180. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

181. Press CH30-1 ON and verify the lights of the two preceeding steps go OFF.

182. Press CH30-1 OFF.

183. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

184. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

185. Press CH30-1 ON and verify the lights of the two preceeding steps go OFF.

186. Press CH30-15 and CH30-1 OFF.

187. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

188. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

189. Press CH30-15 and CH30-1 ON and verify that the lights of the two preceeding steps go OFF.

190. Press CH30-1 OFF.

191. On either DSKY verify that the COMP ACTY, STBY and RESTART lights are ON.

192. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M32, M38, M39 and M40 N22, N26, N27 and N28.

193. Press CH30-1 ON.

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194. Press ALARM RESET.

195. When the COMP ACTY light goes OFF, verify that all lights on the DSKY section of the XY Interface Panel are OFF.

196. Press CH30-1 OFF.

197. Set T12 and INHIBIT INCREMENT switches ON.

198. Stamp data sheet if the test was successfully completed. If a failure occurred during this test repeat all steps starting with step 143. If a second failure occurs discontinue further testing.

PROGRAM ANALYSIS - DSKY DISPLAY

The DSKY Test is a fully automatic test routine which starts in Bank 5, Location 1400 and is applicable to both DSKY's. The sequence of program functions are performed in the order listed below.

a. Clears all DSKY Indicators and Display Registers.

b. Lights DSKY Indicators one at a time in the order listed below:

1. UPLINK ACTY
2. AUTO
3. HOLD
4. FREE
5. NO ATT
6. KEY REL (Flashing)
7. TEMP
8. GIMBAL LOCK
9. PROG
10. RESTART
11. TRACKER
12. blank
13. OPR ERR (Flashing)

c. Lights DSKY Indicators RESTART and STBY together.

d. Lights entire panel with KEY REL and OPR ERR flashing.

e. Turns on DSKY COMP ACTY indicator. (This indicator will remain on for the DSKY Register test.

f. Write +00000 into DSKY Registers 1, 2, and 3 and flashes 00 in the VERB and NOUN displays.

g. Writes -11111 into DSKY Registers 1, 2, and 3 and flashes 11 in the VERB and NOUN displays.

h. Writes +22222 into DSKY Registers 1, 2, and 3 and flashes 22 in the VERB and NOUN displays.

i. Write -33333 into DSKY Registers 1, 2, and 3 and flashes 33 in the VERB and NOUN displays.

j. Writes +44444 into DSKY Registers 1, 2, and 3 and flashes 44 in the VERB and NOUN displays.

k. Writes -55555 into DSKY Registers 1, 2, and 3 and flashes 55 in the VERB and NOUN displays.

l. Writes +66666 into DSKY Registers 1, 2, and 3 and flashes 66 in the VERB and NOUN displays.

m. Writes -77777 into DSKY Registers 1, 2, and 3 and flashes 77 in the VERB and NOUN displays.

n. Writes +88888 into DSKY Registers 1, 2, and 3 and flashes 88 in the VERB and NOUN displays.

o. Writes -99999 into DSKY Registers 1, 2, and 3 and flashes 99 in the VERB and NOUN displays.

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p. Displays 70707 alternating with 07070 on the REG SEL display (with register select switch set to L). This display will be presented for 15 seconds, after which time the entire test will automatically repeat. The T12 COUNTER STOP switch should be set to the ON position during this display, so that all DSKY displays will be in the clear condition at the conclusion of testing. Success or failure of this test is determined visually by the operator noting that all displays occur as specified.

199. Transfer Control to Bank 5, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

200. Press the MONITOR indicator switch to the on (illuminated) position and set the register select switch to the L position.

201. Press the CL Key.

202. Set the T12 COUNTER STOP switch to the OFF position.

203. Set the INHIBIT INCREMENTS switch to the OFF position.

204. Press the PROCEED button.

205. Verify that the DSKY UPLINK ACTY indicator turns on.

206. Verify that DSKY indicator:
UPLINK ACTY turns off
AUTO turns on

207. Verify that DSKY indicator:
AUTO turns off
HOLD turns on

208. Verify that DSKY indicator:
HOLD turns off
FREE turns on

209. Verify that DSKY indicator:
FREE turns off
NO ATT turns on

210. Verify that DSKY indicator:
NO ATT turns off
KEY REL turns on and is flashing

211. Verify that DSKY indicator:
KEY REL turns off
TEMP turns on

212. Verify that DSKY indicator:
TEMP turns off
GIMBAL LOCK turns on

213. Verify that DSKY indicator:
GIMBAL LOCK turns off
PROG turns on

214. Verify that DSKY indicator:
PROG turns off
RESTART turns on

215. Verify that DSKY indicator:
RESTART turns off
TRACKER turns on

216. Verify that DSKY indicator:
TRACKER turns off
blank (screen) turns on

217. Verify that DSKY indicator:
blank (screen) turns off
OPR ERR turns on and is flashing

218. Verify that DSKY indicator:
OPR ERR turns off
RESTART and STBY turn on together

219. Verify that all of the DSKY indicators mentioned above, are on with the KEY REL and OPR ERR indicators flashing.

220. Verify that the DSKY COMP ACTY indicator turns on. This indicator should remain on for the rest of the test.

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221. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +00000
Register 2 = +00000
Register 3 = +00000
VERB = 00 (Flashing)
NOUN = 00 (Flashing)

222. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -11111
Register 2 = -11111
Register 3 = -11111
VERB = 11 (Flashing)
NOUN = 11 (Flashing)

223. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +22222
Register 2 = +22222
Register 3 = +22222
VERB = 22 (Flashing)
NOUN = 22 (Flashing)

224. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -33333
Register 2 = -33333
Register 3 = -33333
VERB = 33 (Flashing)
NOUN = 33 (Flashing)

225. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +44444
Register 2 = +44444
Register 3 = +44444
VERB = 44 (Flashing)
NOUN = 44 (Flashing)

226. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -55555
Register 2 = -55555
Register 3 = -55555
VERB = 55 (Flashing)
NOUN = 55 (Flashing)

227. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +66666
Register 2 = +66666
Register 3 = +66666
VERB = 66 (Flashing)
NOUN = 66 (Flashing)

228. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -77777
Register 2 = -77777
Register 3 = -77777
VERB = 77 (Flashing)
NOUN = 77 (Flashing)

229. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +88888
Register 2 = +88888
Register 3 = +88888
VERB = 88 (Flashing)
NOUN = 88 (Flashing)

230. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -99999
Register 2 = -99999
Register 3 = -99999
VERB = 99 (Flashing)
NOUN = 99 (Flashing)

DATE ________

165. Press CH30-1 ON and verify that the lights of the two preceeding steps to OFF.

166. Press CH30-1 OFF.

167. On either DSKY verify that the COMP ACTY and GIMBAL LOCK lights are ON.

168. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

169. Press CH30-1 ON and verify that the lights of the two preceeding steps go OFF.

170. Press CH30-1 OFF.

171. On either DSKY verify that the COMP ACTY light is ON.

172. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M31 and N21.

173. Press CH30-1 ON and verify that the lights of the two preceeding steps go OFF.

174. Press CH30-1 OFF.

175. On either DSKY verify that the COMP ACTY and TRACKER lights are ON.

176. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

177. Press CH30-1 ON and verify the lights of the two preceeding steps go OFF.

178. Press CH30-1 OFF.

179. On either DSKY verify that the COMP ACTY and PROGRAM lights are ON.

180. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

181. Press CH30-1 ON and verify the lights of the two preceeding steps go OFF.

182. Press CH30-1 OFF.

183. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

184. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

185. Press CH30-1 ON and verify the lights of the two preceeding steps go OFF.

186. Press CH30-15 and CH30-1 OFF.

187. On either DSKY verify that the COMP ACTY and TEMP lights are ON.

188. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M40 and N28.

189. Press CH30-15 and CH30-1 ON and verify that the lights of the two preceeding steps go OFF.

190. Press CH30-1 OFF.

191. On either DSKY verify that the COMP ACTY, STBY and RESTART lights are ON.

192. On the XY Interface Panel verify that only the following lights are ON in the DSKY section: M32, M38, M39 and M40 N22, N26, N27 and N28.

193. Press CH30-1 ON.

DATE ______

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194. Press ALARM RESET.

195. When the COMP ACTY light goes OFF, verify that all lights on the DSKY section of the XY Interface Panel are OFF.

196. Press CH30-1 OFF.

197. Set T12 and INHIBIT INCREMENT switches ON.

198. Stamp data sheet if the test was successfully completed. If a failure occurred during this test repeat all steps starting with step 143. If a second failure occurs discontinue,further testing.

PROGRAM ANALYSIS - DSKY DISPLAY

The DSKY Test is a fully automatic test routine which starts in Bank 5, Location 1400 and is applicable to both DSKY's. The sequence of program functions are performed in the order listed below.

a. Clears all DSKY Indicators and Display Registers.

b. Lights DSKY Indicators one at a time in the order listed below:

1. UPLINK ACTY
2. AUTO
3. HOLD
4. FREE
5. NO ATT
6. KEY REL (Flashing)
7. TEMP
8. GIMBAL LOCK
9. PROG
10. RESTART
11. TRACKER
12. blank
13. OPR ERR (Flashing)

c. Lights DSKY Indicators RESTART and STBY together.

d. Lights entire panel with KEY REL and OPR ERR flashing.

e. Turns on DSKY COMP ACTY indicator. (This indicator will remain on for the DSKY Register test.

f. Write +00000 into DSKY Registers 1, 2, and 3 and flashes 00 in the VERB and NOUN displays.

g. Writes -11111 into DSKY Registers 1, 2, and 3 and flashes 11 in the VERB and NOUN displays.

h. Writes +22222 into DSKY Registers 1, 2, and 3 and flashes 22 in the VERB and NOUN displays.

i. Write -33333 into DSKY Registers 1, 2, and 3 and flashes 33 in the VERB and NOUN displays.

j. Writes +44444 into DSKY Registers 1, 2, and 3 and flashes 44 in the VERB and NOUN displays.

k. Writes -55555 into DSKY Registers 1, 2, and 3 and flashes 55 in the VERB and NOUN displays.

l. Writes +66666 into DSKY Registers 1, 2, and 3 and flashes 66 in the VERB and NOUN displays.

m. Writes -77777 into DSKY Registers 1, 2, and 3 and flashes 77 in the VERB and NOUN displays.

n. Writes +88888 into DSKY Registers 1, 2, and 3 and flashes 88 in the VERB and NOUN displays.

o. Writes -99999 into DSKY Registers 1, 2, and 3 and flashes 99 in the VERB and NOUN displays.

DATE ______

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p. Displays 70707 alternating with 07070 on the REG SEL display (with register select switch set to L). This display will be presented for 15 seconds, after which time the entire test will automatically repeat. The T12 COUNTER STOP switch should be set to the ON position during this display, so that all DSKY displays will be in the clear condition at the conclusion of testing. Success or failure of this test is determined visually by the operator noting that all displays occur as specified.

199. Transfer Control to Bank 5, Location 1400 using the procedures of JDC 05412 (Transfer Control Operating Procedure).

200. Press the MONITOR indicator switch to the on (illuminated) position and set the register select switch to the L position.

201. Press the CL Key.

202. Set the T12 COUNTER STOP switch to the OFF position.

203. Set the INHIBIT INCREMENTS switch to the OFF position.

204. Press the PROCEED button.

205. Verify that the DSKY UPLINK ACTY indicator turns on.

206. Verify that DSKY indicator:
UPLINK ACTY turns off
AUTO turns on

207. Verify that DSKY indicator:
AUTO turns off
HOLD turns on

208. Verify that DSKY indicator:
HOLD turns off
FREE turns on

209. Verify that DSKY indicator:
FREE turns off
NO ATT turns on

210. Verify that DSKY indicator:
NO ATT turns off
KEY REL turns on and is flashing

211. Verify that DSKY indicator:
KEY REL turns off
TEMP turns on

212. Verify that DSKY indicator:
TEMP turns off
GIMBAL LOCK turns on

213. Verify that DSKY indicator:
GIMBAL LOCK turns off
PROG turns on

214. Verify that DSKY indicator:
PROG turns off
RESTART turns on

215. Verify that DSKY indicator:
RESTART turns off
TRACKER turns on

216. Verify that DSKY indicator:
TRACKER turns off
blank (screen) turns on

217. Verify that DSKY indicator:
blank (screen) turns off
OPR ERR turns on and is flashing

218. Verify that DSKY indicator:
OPR ERR turns off
RESTART and STBY turn on together

219. Verify that all of the DSKY indicators mentioned above,are on with the KEY REL and OPR ERR indicators flashing:

220. Verify that the DSKY COMP ACTY indicator turns on. This indicator should remain on for the rest of the test.

DATE ______

---

221. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +00000
Register 2 = +00000
Register 3 = +00000
VERB = 00 (Flashing)
NOUN = 00 (Flashing)

222. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -11111
Register 2 = -11111
Register 3 = -11111
VERB = 11 (Flashing)
NOUN = 11 (Flashing)

223. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +22222
Register 2 = +22222
Register 3 = +22222
VERB = 22 (Flashing)
NOUN = 22 (Flashing)

224. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -33333
Register 2 = -33333
Register 3 = -33333
VERB = 33 (Flashing)
NOUN = 33 (Flashing)

225. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +44444
Register 2 = +44444
Register 3 = +44444
VERB = 44 (Flashing)
NOUN = 44 (Flashing)

226. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -55555
Register 2 = -55555
Register 3 = -55555
VERB = 55 (Flashing)
NOUN = 55 (Flashing)

227. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +66666
Register 2 = +66666
Register 3 = +66666
VERB = 66 (Flashing)
NOUN = 66 (Flashing)

228. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -77777
Register 2 = -77777
Register 3 = -77777
VERB = 77 (Flashing)
NOUN = 77 (Flashing)

229. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = +88888
Register 2 = +88888
Register 3 = +88888
VERB = 88 (Flashing)
NOUN = 88 (Flashing)

230. Verify that the DSKY VERB, NOUN, and Registers display:

Register 1 = -99999
Register 2 = -99999
Register 3 = -99999
VERB = 99 (Flashing)
NOUN = 99 (Flashing)

DATE ______

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST	JDC 05783 REV — PAGE 17 OF 17	
SUBSYSTEM Computer	ASSY	

231. Verify that the DSKY display is clear, and the REG SEL display is 70707 alternating with 07070. Set the T12 COUNTER STOP switch to the ON position immediately after verifying the REG SEL display. If a failure was observed during this test, do not turn ON the T12 COUNTER STOP switch. Allow the test program to recycle twice, and if the malfunction is still present, discontinue further testing. Stop the computer coincident with the REG SEL display, as described above.

232. Set the INHIBIT INCREMENT switch to the ON position.

233. Press the FRESH START button and stamp data sheet if the test was successful.

234. Proceed to the CSS Power Turn-off section of JDC 05420. (See Figure 1 of JDC 05770).

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05783 JDC
REV. —
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

ASSEMBLY UNDER TEST

TITLE ____________

SER. NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION

TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________ SER. NO. ________ CAL DATE

NAME ____________ SER. NO. ________ CAL DATE

CONDUCTED BY ____________ NAME/AFFILIATION APPROVED BY ____________ NAME/AFFILIATION

Step	Parameter	Specification	Results
139.	Channels 30, 31, and 32 test (steps 7 through 139) completed successfully.		
198.	DSKY Spacecraft Signals (steps 142 through 198) completed successfully.		
233.	DSKY Display test (steps 199 through 232) completed successfully.		

DATE ________

231. Verify that the DSKY display is clear, and the REG SEL display is 70707 alternating with 07070. Set the T12 COUNTER STOP switch to the ON position immediately after verifying the REG SEL display. If a failure was observed during this test, do not turn ON the T12 COUNTER STOP switch. Allow the test program to recycle twice, and if the malfunction is still present, discontinue further testing. Stop the computer coincident with the REG SEL display, as described above.

232. Set the INHIBIT INCREMENT switch to the ON position.

233. Press the FRESH START button and stamp data sheet if the test was successful.

234. Proceed to the CSS Power Turn-off section of JDC 05420. (See Figure 1 of JDC 05770).

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05783 JDC
REV. —
INITIAL TDRR 32809

JOB OPERATING PROCEDURE FOR (FVP) PROGRAM-ALLEREST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
139.	Channels 30, 31, and 32 test (steps 7 through 139) completed successfully.		
198.	DSKY Spacecraft Signals (steps 142 through 198) completed successfully.		
233.	DSKY Display test (steps 199 through 232) completed successfully.		

DATE ______

4

JDC 05784 REV. A PAGE 1 OF 1
INITIAL TDRR 32809 D.S. PGS 0

JOB ALLEREST MYLAR TAPE

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

JDC 05784 Revision 0 is a mylar tape used in conjunction with the Operating Procedures for the ALLEREST Program, JDC 05783.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	12-14-67	35239	All	-	EA	-

REFERENCES
JDC 05783
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 26 JAN 67

JDC 05784 REV. — PAGE 1 OF 1

INITIAL TDRR 32809 D.S. PGS ___

JOB ALLEREST MYLAR TAPE

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the ALLEREST Program, JDC 05782.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC 05783
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ___

JDC 05784 REV. — PAGE 1 OF 1

JOB ALLEREST MYLAR TAPE

INITIAL TDRR 32809 D.S. PGS ___

SUBSYSTEM Computer

ASSY. Block II - C Computer

DESCRIPTION

This JDC is a mylar tape used in conjunction with the Operating Procedures for the ALLEREST Program, JDC 05782.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA

REFERENCES
JDC 05783
ND's 1021042, 1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ___

JOB CLOCK STABILITY TEST

JDC 05785 **REV.** - **PAGE** 1 **OF** 2

INITIAL TDRR 35464 **D.S. PGS** 5

SUBSYSTEM Computer

ASSY. Block II C-Computer

DESCRIPTION

Tests the oscillator stability and temperature, and resistance of temperature sensor in tray B in the computer using the Calibration Console P/N 2014049 or the Auxiliary Calibration Console P/N 2014059.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES JDC 05400, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

NOTE: All controls and indicators referenced in this test are on the Calibration Console and the Auxiliary Calibration Console.

PREPARATION

1. On the Recorder:

   a. Set the RECORD switch to the ON position.

   b. Set the SPACE SELECTOR switch to the 1 position.

2. Set up the Electronic Counter according to JDC 05400. Set the FREQ-TIME switch to the 100 sec position (located between CPS and 1000 SEC).

3. Set the TIME BASE switch on the rear panel of the Electronic Counter to the EXT position.

4. Connect P1 of cable W259 to the COMPUTER SIGNAL jack on the Control and Interface Panel (Calibration Console) or connect P1 of cable W259 to the UUT jack on the Signal Interface panel (Auxiliary Calibration Console).

5. Connect P2 and P3 respectively of cable W259 to the SIGNAL HI and SIGNAL LO jacks of the Digital Ohmmeter.

6. Set the selector switch on the Digital Ohmmeter to the PRINT position.

OPERATION

NOTE: Perform steps 7 through 16 for every three hours of continuous operating time.

7. Monitor the Digital Ohmmeter indication. Record on data sheet.

VERIFICATION WITH SIOL REQUIRED BEFORE USE **DATE** ______

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8. Calculate the temperature equivalent of the resistance recorded in step 7 using the oscillator temperature resistance curve supplied with the computer data package. Record on data sheet.

9. Monitor the frequency printed by the recorder (7 LSD). Calculate the frequency by using the formula:

Freq = 2 (1,000,000.00 + Printed Frequency)

Record on data sheet.

10. Note the date that the temperature-frequency curve was drawn, and calculate the aging factor of 0.0035 pps/day (from the date of the graph to the present). Record on data sheet. The aging factor is added to the ± 0.10 pps tolerance specified in step 11, and adjusts the frequency deviation limits relative to the age of the oscillator.

11. Calculate the frequency deviation at the temperature recorded in step 8 using the temperature-frequency curve supplied with the computer data package. Record on data sheet. The frequency recorded in step 9 must remain within 0.10 pps (plus the aging factor) of the temperature-frequency curve.

12. Disconnect plugs P2 and P3 on cable W259 from the Digital ohmmeter.

13. Connect plugs P7 and P8 respectively of cable W259 to the SIGNAL HI and SIGNAL LO jacks of the Digital Ohmmeter.

14. Monitor the Digital Ohmmeter indication. Record on data sheet.

15. Record the date and the time on the data sheet.

16. Disconnect plugs P7 and P8 on cable W259 from the Digital Ohmmeter.

17. Connect plugs P2 and P3 respectively on cable W259 to the SIGNAL HI and SIGNAL LO jacks of the Digital Ohmmeter.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 5

JDC NO. 05785
REV. ______
INITIAL TDRR 35464

JOB CLOCK STABILITY TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE ______

NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
	FIRST RECORDING		
7.	Digital Ohmmeter Indication	None	
8.	Oscillator Temperature	As specified by oscillator temperature-resistance curve	
9.	Frequency	F = 2 (1,000,000.00 + Printed Frequency)	
10.	Aging Factor Calculation	0.0035 pps/day from date of graph	
11.	Frequency Deviation	Within 0.10 pps (plus aging factor) of oscillator temperature-frequency curve	
14.	Digital Ohmmeter Indication	None	
15.	Date	None	
	Time	None	
	SECOND RECORDING		
7.	Digital Ohmmeter Indication	None	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 5

JDC NO. 05785
REV. ______

JOB CLOCK STABILITY TEST

Step	Parameter	Specification	Results
8.	Oscillator Temperature	As specified by oscillator temperature-resistance curve	
9.	Frequency	F = 2 (1,000,000.00 + Printed Frequency)	
10.	Aging Factor Calculation	0.0035 pps/day from date of graph	
11.	Frequency Deviation	Within 0.10 pps (plus aging factor) of oscillator temperature-frequency curve	
14.	Digital Ohmmeter Indication	None	
15.	Date	None	
	Time	None	
	THIRD RECORDING		
7.	Digital Ohmmeter Indication	None	
8.	Oscillator Temperature	As specified by oscillator temperature-resistance curve	
9.	Frequency	F = 2 (1,000,000.00 + Printed Frequency)	
10.	Aging Factor Calculation	0.0035 pps/day from date of graph	
11.	Frequency Deviation	Within 0.10 pps (plus aging factor) of oscillator temperature-frequency curve	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 5

JDC NO. 05785
REV. ____

JOB CLOCK STABILITY TEST

Step	Parameter	Specification	Results
14.	Digital Ohmmeter Indication	None	
15.	Date	None	
	Time	None	
	FOURTH RECORDING		
7.	Digital Ohmmeter Indication	None	
8.	Oscillator Temperature	As specified by oscillator temperature resistance curve	
9.	Frequency	F = 2 (1,000,000.00 + Printed Frequency)	
10.	Aging Factor Calculation	0.0035 pps/day from date of graph	
11.	Frequency Deviation	Within 0.10 pps (plus aging factor) of oscillator temperature-frequency curve	
14.	Digital Ohmmeter Indication	None	
15.	Date	None	
	Time	None	
	FIFTH RECORDING		
7.	Digital Ohmmeter Indication	None	
8.	Oscillator Temperature	As specified by oscillator temperature-resistance curve	
9.	Frequency	F = 2 (1,000,000.00 + Printed Frequency)	

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 5

JDC NO. 05785
REV. ____

JOB CLOCK STABILITY TEST

Step	Parameter	Specification	Results
10.	Aging Factor Calculation	0.0035 pps/day from date of graph	
11.	Frequency Deviation	Within 0.10 pps (plus aging factor) of oscillator temperature-frequency curve	
14.	Digital Ohmmeter Indication	None	
15.	Date	None	
	Time	None	
	SIXTH RECORDING		
7.	Digital Ohmmeter Indication	None	
8.	Oscillator Temperature	As specified by oscillator temperature-resistance curve	
9.	Frequency	F = 2 (1,000,000.00 + Printed Frequency)	
10.	Aging Factor Calculation	0.0035 pps/day from date of graph	
11.	Frequency Deviation	Within 0.10 pps (plus aging factor) of oscillator temperature-frequency curve	
14.	Digital Ohmmeter Indication	None	
15.	Date	None	
	Time	None	

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 5

JDC NO. 05785
REV. ____

JOB CLOCK STABILITY TEST

Step	Parameter	Specification	Results
	SEVENTH RECORDING		
7.	Digital Ohmmeter Indication	None	
8.	Oscillator Temperature	As specified by oscillator temperature-resistance curve	
9.	Frequency	F = 2 (1,000,000.00 + Printed Frequency)	
10.	Aging Factor Calculation	0.0035 pps/day from date of graph	
11.	Frequency Deviation	Within 0.10 pps (plus aging factor) of oscillator temperature-frequency curve	
14.	Digital Ohmmeter Indication	None	
15.	Date	None	
	Time	None	

JOB RADAR SIGNAL MEASUREMENTS TEST | JDC 05786 REV. A PAGE 1 OF 13
INITIAL TDRR 35464 D.S. PGS 5

SUBSYSTEM Computer | ASSY. Block II C-Computer

DESCRIPTION

Provides procedures for checking the following radar functions:

a) The operation of Channel 13
b) Pulse and phase characteristics of rendevous and landing radar signals
c) The operation of the Radar Counter (EMA 0046) with low one and high zero marginal input pulse levels.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5-3-68	36182	2,3,7,10	1	EA BD	-

REFERENCES JDC's 05400 through 05405 JDC's 05413, 05414, 05129, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

NOTE: Unless otherwise specified, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, Logic Drawer No. 2 panel, and XY Interface Panel of the CTS.

CHANNEL 13 CHECK

3. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

4. Press Keys CL, 00013, 42525.

5. Verify that the RZ display is 0000 000 000 001 011.

6. Verify that the REG SEL display is 0100 010 101 010 101.

7. Press the CHANNEL button.

8. Press the EXECUTE button.

9. Verify that the LINC indicator is on.

10. Press the READ-AGC indicator switch to the on (illuminated) position.

11. Press Keys CL, 0013.

12. Verify that the RZ display is 0000 000 000 001 011.

13. Press the CHANNEL button.

14. Press the EXECUTE button.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 18 JAN 68

15. Verify that the OINC and LINC indicators are on.

16. Verify that the REG SEL display is 1100 010 001 010 101. Stamp data sheet.

17. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

18. Press Keys CL, 00013, 01252.

19. Verify that the RZ display is 0000 000 000 001 011.

20. Verify that the REG SEL display is 0000 001 010 101 010.

21. Press the CHANNEL button.

22. Press the EXECUTE button.

23. Verify that the OINC and LINC indicators are on.

24. Press the READ-AGC indicator switch to the on (illuminated) position.

25. Press Keys CL, 0013.

26. Verify that the RZ display is 0000 000 000 001 011.

27. Press the CHANNEL button.

28. Press the EXECUTE button.

29. Verify that the OINC and LINC indicators are on.

30. Verify that the REG SEL display is 0000 001 010 101 010. Stamp data sheet.

31. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

32. Press Keys CL, 00013, 00000.

33. Verify that the RZ display is 0000 000 000 001 011.

34. Verify that the REG SEL display is 0000 000 000 000 000.

35. Press the CHANNEL button.

36. Press the EXECUTE button.

37. Verify that the OINC and LINC indicators are on.

38. Press the READ-AGC indicator switch to the on (illuminated) position.

39. Press Keys CL, 0013.

40. Verify that the RZ display is 0000 000 000 001 011.

41. Press the CHANNEL button.

42. Press the EXECUTE button.

43. Verify that the OINC and LINC indicators are on.

44. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

45. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

46. Press Keys CL, 00013, 43777.

47. Verify that the RZ display is 0000 000 000 001 011.

48. Verify that the REG SEL display is 0100 011 111 111 111.

49. Press the CHANNEL button.

50. Press the EXECUTE button.

51. Verify that the OINC and LINC indicators are on.

52. Press the READ-AGC indicator switch to the on (illuminated) position.

53. Press Keys CL, 0013.

54. Verify that the RZ display is 0000 000 000 001 011.

55. Press the CHANNEL button.

56. Press the EXECUTE button.

DATE 18 JAN 68

57. Verify that the OINC and LINC indicators are on.

58. Verify that the REG SEL display is 1100 011 011 111 111. Stamp data sheet.

59. Press FRESH START.

60. Deleted.

61. Press Keys CL, 0013.

62. Verify that the RZ display is 0000 000 000 001 011.

63. Press the CHANNEL button.

64. Press the EXECUTE button.

65. Verify that the OINC indicator is on.

66. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

RADAR COUNTERS OUTPUT SIGNAL MEASUREMENT

PREPARATION

67. Inspect the signal cabling between the XY Interface Panel and the Frequency Counter and Oscilloscope Panel for the connections specified in JDC 05129, step 12.

68. Assure that the STRT1/STRT2 switch on the Buffer Circuit Assembly is set to the ON position.

69. Press the LOAD CHAN S 510 OHMS pushbutton indicator to the on or illuminated state.

70. Press the LOAD CHAN T 510 OHMS pushbutton indicator to the on or illuminated state.

NOTE: Unless specified otherwise, the Oscilloscope and Frequency Counter used to perform this test are to be operated as specified in the applicable JDC (05400 through 05405).

SIGNALS XA041 and XA047

71. Press the KEYBOARD LOAD pushbutton indicator to the on (or illuminated) position.

72. Press the CL Key.

73. Press Keys 00100, 00011.

74. Press EXECUTE.

75. Press Keys CL, 00101, 30100.

76. Press the EXECUTE button.

77. Press Keys CL, 00102, 00006.

78. Press the EXECUTE button.

79. Press Keys CL, 00103, 01013.

80. Press the EXECUTE button.

81. Press Keys CL, 00104, 00104.

82. Press the EXECUTE button.

83. Set the CHANNEL S switches to position 313.

84. Set the FREQ + PHASE switch to the FRS S → T position.

85. Set the Frequency Counter switches as follows: FUNCTION switch to COUNT A. GATE switch to OPEN, FREQ A SLOPE switch to "+". Adjust INPUT VOLTS RMS switches and TRIGGER LEVEL controls as necessary.

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86. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

87. Press Keys CL, 0101.

88. Press the EXECUTE button.

89. Set the T12 COUNTER STOP switch to the OFF position.

90. Press the MONITOR indicator switch to the on (illuminated) position.

91. Press the Frequency Counter RESET button.

92. Press the PROCEED button.

93. Verify a display of 15 on the Frequency Counter. Record on data sheet.

94. Set the T12 COUNTER STOP switch to the ON position.

95. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

96. Press Keys CL, 0101.

97. Press the EXECUTE button.

98. Set the T12 COUNTER STOP to the OFF position.

99. Press the MONITOR indicator switch to the on (illuminated) position.

100. Set the CHANNEL T switch to position 215.

101. Set the FREQ + PHASE switch to the FRT T → S position.

102. Press the RESET button on the Frequency Counter.

103. Press the PROCEED button.

104. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA042

105. Set the T12 COUNTER STOP switch to the ON position.

106. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

107. Press Keys CL, 00100, 00012.

108. Press the EXECUTE button.

109. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

110. Press Keys CL, 0101.

111. Press the EXECUTE button.

112. Set the T12 COUNTER STOP switch to the OFF position.

113. Press the MONITOR indicator switch to the on (illuminated) position.

114. Set the CHANNEL T switches to position 216.

115. Press the RESET button on the Frequency Counter.

116. Press the PROCEED button.

117. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNALS XA051 AND XA043

118. Set the T12 COUNTER STOP switch to the ON position.

119. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

120. Press Keys CL, 00100, 00014.

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121. Press the EXECUTE button.

122. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

123. Press Keys CL, 0101.

124. Press the EXECUTE button.

125. Set the T12 COUNTER STOP switch to the OFF position.

126. Press the MONITOR indicator switch to the on (illuminated) position.

127. Set the CHANNEL S switches to position 314.

128. Set the CHANNEL T switches to position 217.

129. Set the FREQ + PHASE switch to the FRS S → T position.

130. Press the RESET button on the Frequency Counter.

131. Press the PROCEED button.

132. Verify a display of 15 on the Frequency Counter. Record on data sheet.

133. Set the T12 COUNTER STOP switch to the ON position.

134. Set the FREQ + PHASE switch to the FRT T → S position.

135. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

136. Press Keys CL, 0101.

137. Press the EXECUTE button.

138. Set the T12 COUNTER STOP switch to the OFF position.

139. Press the MONITOR indicator switch to the on (illuminated) position.

140. Press the RESET button on the Frequency Counter.

141. Press the PROCEED button.

142. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA044

143. Set the T12 COUNTER STOP switch to the ON position.

144. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

145. Press Keys CL, 00100, 00015.

146. Press the EXECUTE button.

147. Set the CHANNEL T switches for position 218.

148. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

149. Press Keys CL, 0101.

150. Press the EXECUTE button.

151. Set the T12 COUNTER STOP switch to the OFF position.

152. Press the MONITOR indicator switch to the on (illuminated) position.

153. Press the RESET button on the Frequency Counter.

154. Press the PROCEED button.

155. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA045

156. Set the T12 COUNTER STOP switch to the ON position.

157. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

158. Press Keys CL, 00100, 00016.

159. Press the EXECUTE button.

160. Set the CHANNEL T switches for position 219.

161. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

162. Press Keys CL, 0101.

163. Press the EXECUTE button.

164. Set the T12 COUNTER STOP switch to the OFF position.

165. Press the MONITOR indicator switch to the on (illuminated) position.

166. Press the RESET button on the Frequency Counter.

167. Press the PROCEED button.

168. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA046

169. Set the T12 COUNTER STOP switch to the ON position.

170. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

171. Press Keys CL, 00100, 00017.

172. Press the EXECUTE button.

173. Set the CHANNEL T switches for position 220.

174. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

175. Press Keys CL, 0101.

176. Press the EXECUTE button.

177. Set the T12 COUNTER STOP switch to the OFF position.

178. Press the MONITOR indicator switch to the on (illuminated) position.

179. Press the RESET button on the Frequency Counter.

180. Press the PROCEED button.

181. Verify a display of 256 on the Frequency Counter. Record on data sheet.

182. Set the T12 COUNTER STOP switch to the ON position.

PULSE CHARACTERISTICS OF SIGNALS XA041 AND XA047

183. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

184. Press Keys CL, 00100, 00011.

185. Press the EXECUTE button.

186. Press Keys CL, 00104, 00101.

187. Press the EXECUTE button.

188. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

189. Press Keys CL, 0101.

190. Press the EXECUTE button.

191. Set the T12 COUNTER STOP switch to the OFF position.

192. Press the MONITOR indicator switch to the on (illuminated) position.

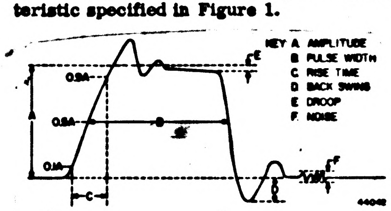
193. Set the FREQ + PHASE switch to the OFF position.

194. Set the SCOPE switch to position DIFF T.

195. Set the CHANNEL T switches for position 215.

196. Set Oscilloscope MODE switch to A + B. Press the PROCEED button.

197. Measure and record the pulse characteristic specified in Figure 1.



NOTE: Slight jitter may be observed on oscilloscope display during pulse measurements. This condition should not be interpreted as indicating a defective interface channel.

Figure 1

198. Set the CHANNEL S switches for position 313.

199. Set the SCOPE switch to position DIFF S.

200. Measure and record the pulse characteristics specified in Figure 1.

201. Set the SCOPE switch to position ALTERNATE S → T.

202. Adjust the Oscilloscope as follows:

a. Provide an external sync from channel A to the NORMAL AND DELAYING TRIGGER EXT TRIG input.

b. Set TIME/CM to 10 msec.

c. Display Logic to NORM.

d. Mode switch to ALT.

203. Use the X5 or X10 Magnifier to measure and record the time delay from the last pulse on CHANNEL T to the first pulse on CHANNEL S.

204. Set the CHANNEL S switches to position 113.

205. Set the FREQ + PHASE switch to position FRT T → S.

206. Set the Frequency Counter switches as follows; the FUNCTION switch to TIME A → B, the GATE switch to AUTO, the FREQ A SLOPE switch to "-" and the STOP SLOPE to "+".

207. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

208. Set the CHANNEL T switches to position 313.

209. Set the CHANNEL S switches for position 112. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA042

210. Set the T12 COUNTER STOP switch to the ON position.

211. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

212. Press Keys CL, 00100, 00012.

213. Press the EXECUTE button.

214. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

215. Press Keys CL, 0101.

216. Press the EXECUTE button.

217. Set the T12 COUNTER STOP switch to the OFF position.

218. Press the MONITOR indicator switch to the on (illuminated) position.

219. Set the FREQ + PHASE switch to the OFF position.

220. Set the SCOPE switch to position DIFF T.

221. Set the CHANNEL T switches for position 216.

222. Press the PROCEED button.

223. Measure and record the pulse characteristics specified in Figure 1.

224. Set the CHANNEL S switches for position 113.

225. Set the FREQ + PHASE switch to position FRT T → S.

226. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNALS XA043 AND XA051.

227. Set the T12 COUNTER STOP switch to the ON position.

228. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

229. Press Keys CL, 00100, 00014.

230. Press the EXECUTE button.

231. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

232. Press Keys CL, 0101.

233. Press the EXECUTE button.

234. Set the T12 COUNTER STOP switch to the OFF position.

235. Press the MONITOR indicator switch to the on (illuminated) position.

236. Set the FREQ + PHASE switch to the OFF position.

237. Set the CHANNEL T switches for position 217.

238. Press the PROCEED button.

239. Measure and record the pulse characteristics specified in Figure 1.

240. Set the CHANNEL S switches for position 314.

241. Set the SCOPE switch to the DIFF S position.

242. Measure and record the pulse characteristics specified in Figure 1.

243. Set the SCOPE switch to position ALTERNATE S → T.

244. Adjust the Oscilloscope as follows:

a. Provide an external sync from channel A to the NORMAL AND DELAYING TRIGGER EXT TRIG input.

b. Set TIME/CM to 10 msec.

c. Display Logic to NORM.

d. Mode switch to ALT.

245. Use the X5 and X10 Magnifier to measure and record the time delay from the last pulse on CHANNEL T to the first pulse on CHANNEL S.

246. Set the CHANNEL S switches to position 113.

247. Set the FREQ + PHASE switch to position FRT T → S.

248. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

249. Set the CHANNEL T switches for position 314.

250. Set the CHANNEL S switches for position 112.

251. Measure and record the time delay from the falling edge of CNTR-A signal, and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA044

252. Set the T12 COUNTER STOP switch to the ON position.

253. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

254. Press Keys CL, 03100, 00015.

255. Press the EXECUTE button.

256. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

257. Press Keys CL, 0101.

258. Press the EXECUTE button.

259. Set the T12 COUNTER STOP switch to the OFF position.

260. Press the MONITOR indicator switch to the on (illuminated) position.

261. Set the FREQ + PHASE switch to the OFF position.

262. Set the SCOPE switch to position DIFF T.

263. Set the CHANNEL T switches for position 218.

264. Press the PROCEED button.

265. Measure and record the pulse characteristics specified in Figure 1.

266. Set the CHANNEL S switches for position 113.

267. Set the FREQ + PHASE switch to the FRT T → S position.

268. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA045

269. Set the T12 COUNTER STOP switch to the ON position.

270. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

271. Press Keys CL, 00100, 00016.

272. Press the EXECUTE button.

273. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

274. Press Keys CL, 0101.

275. Press the EXECUTE button.

276. Set the T12 COUNTER STOP switch to the OFF position.

277. Press the MONITOR indicator switch to the on (illuminated) position.

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278. Set the FREQ + PHASE switch to the OFF position.

279. Set the SCOPE switch to the DIFF T position.

280. Set the CHANNEL T switches to position 219.

281. Press the PROCEED button.

282. Measure and record the pulse characteristics specified in Figure 1.

283. Set the FREQ + PHASE switch to position FRT T → S.

284. Measure and record the time delay from the falling edge of the CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS FOR SIGNAL XA046

285. Set the T12 COUNTER STOP switch to the ON position.

286. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

287. Press Keys CL, 00100, 00017.

288. Press the EXECUTE button.

289. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

290. Press Keys CL, 0101.

291. Press the EXECUTE button.

292. Set the T12 COUNTER STOP switch to the OFF position.

293. Press the MONITOR indicator switch to the on (illuminated) position.

294. Set the FREQ + PHASE switch to the OFF position.

295. Set the SCOPE switch to the DIFF T position.

296. Set the CHANNEL T switches for position 220.

297. Press the PROCEED button.

298. Measure and record the pulse characteristics specified in Figure 1.

299. Set the FREQ + PHASE switch to the FRT T → S position.

300. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

RADAR COUNTER MARGINAL CHECK

300A. Set T12 COUNTER STOP, INCREMENTS-INHIBIT, and INHIBIT INTERRUPT switches to OFF. Depress FRESH START, PROCEED, ALARM RESET pushbuttons. Depress the DSKY RSET pushbutton. Set INCREMENTS-INHIBIT and INHIBIT INTERRUPT switches to ON.

301. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position, and set the T12 COUNTER STOP switch to the ON position.

302. Press Keys CL, 00100, 00011.

303. Verify that the RZ display is 0000 000 001 000 000.

304. Verify that the REG SEL display is 0000 000 000 001 001.

305. Deleted.

306. Press the EXECUTE button.

307. Verify that the LINC indicator is on.

308. Press Keys CL, 00046, 00000.

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309. Verify that the RZ display is 0000 000 000 100 110.

310. Verify that the REG SEL display is 0000 000 000 000 000.

311. Press the EXECUTE button.

312. Press the READ AGC indicator switch to the on (illuminated) position.

313. Press Keys CL, 0046.

314. Verify that the RZ display is 0000 000 000 100 110.

315. Press the EXECUTE button.

316. Verify that the OINC indicator is on.

317. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

318. Set the AGREEMENT A switches for XXXX 0046.

319. Set the Agreement A function switch to the SAMPLE position.

320. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

321. Press Keys CL, 0101.

322. Verify that the RZ display is 0000 000 001 000 001.

001

323. Press the EXECUTE button.

324. Set the AGC INPUT COUNTERS switch to position 11.

325. Set the Y MARGINS switch to the V3 (Low One) position.

326. Press the POSITIVE indicator switch to the on (illuminated) position.

327. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

328. Press the MONITOR indicator switch to the on (illuminated) position.

329. Set the INCREMENTS INHIBIT switch to the OFF position.

330. Set the T12 COUNTER STOP switch to the OFF position.

331. Press the PROCEED button.

332. Press the SINGLE PULSE button three times.

333. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

334. Set the Y MARGINS switch to the V2 (High Zero) position.

335. Press the SINGLE PULSE button three times.

336. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

337. Press the POSITIVE indicator switch to the off (extinguished) position.

338. Press the NEGATIVE indicator switch to the on (illuminated) position.

339. Press the SINGLE PULSE button three times.

340. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

341. Set the Y MARGINS switch to the V3 position.

342. Press the SINGLE PULSE button three times.

343. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

344. Set the T12 COUNTER STOP switch to the ON position.

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345. Set the INCREMENTS INHIBIT switch to the ON position.

346. Set the Agreement A function switch to the OFF position.

347. Press the NEGATIVE indicator switch to the off (extinguished) position.

348. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

349. Press Keys CL, 00100, 00017.

350. Verify that the RZ display is 0000 000 001 000 000.

351. Verify that the REG SEL display is 0000 000 000 001 111.

352. Press the CHANNEL button.

353. Press the EXECUTE button.

354. Verify that the LINC indicator is on.

355. Press Keys CL, 00046, 00000.

356. Verify that the RZ display is 0000 000 000 100 110.

357. Verify that the REG SEL display is 0000 000 000 000 000.

358. Press the EXECUTE button.

359. Press the READ AGC indicator switch to the on (illuminated) position.

360. Press Keys CL, 0046.

361. Verify that the RZ display is 0000 000 000 100 110.

362. Press the EXECUTE button.

363. Verify that the OINC indicator is on.

364. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

365. Set the Agreement A function switch to the SAMPLE position.

366. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

367. Press Keys CL, 0101.

368. Verify that the RZ display is 0000 000 001 000 001.

001 001

369. Press the EXECUTE button.

370. Set the AGC INPUT COUNTERS switch to position 12.

371. Press the POSITIVE indicator switch to the on (illuminated) position.

372. Press the MONITOR indicator switch to the on (illuminated) position.

373. Set the INCREMENTS INHIBIT switch to the OFF position.

374. Set the T12 COUNTER STOP switch to the OFF position.

375. Press the PROCEED button.

376. Press the SINGLE PULSE button three times.

377. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

378. Set the Y MARGINS switch to the V2 (High Zero) position.

379. Press the SINGLE PULSE button three times.

380. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

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SUBSYSTEM Computer | **ASSY** Block II C-Computer

381. Press the POSITIVE indicator switch to the off (extinguished) position.

382. Press the NEGATIVE indicator switch to the on (illuminated) position.

383. Press the SINGLE PULSE button three times.

384. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

385. Set the Y MARGINS switch to the V3 position.

386. Press the SINGLE PULSE button three times.

387. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

388. Set the T12 COUNTER STOP switch to the ON position.

389. Set the INCREMENTS INHIBIT switch to the ON position.

390. Set the Agreement A function switch to the OFF position.

391. Set the Y MARGINS switch to the NORM position.

392. Press the NEGATIVE indicator switch to the off (extinguished) position.

393. Press the SINGLE PULSE indicator switch to the off (extinguished) position.

394. Set the AGC INPUT COUNTERS switch to position 1.

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 5

JDC
NO. 05786
REV. A
INITIAL TDRR 35464

JOB RADAR SIGNAL MEASUREMENTS TEST

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION ____
TIME ____ START ____ END ____ TOTAL ELAPSED ____

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE ____
NAME ____ SER. NO. ____ CAL DATE ____

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
16	REG SEL Indication	1100 010 001 010 101	____
30	REG SEL Indication	0000 001 010 101 010	____
44	REG SEL Indication	0000 000 000 000 000	____
58	REG SEL Indication	1100 011 011 111 111	____
66	REG SEL Indication	0000 000 000 000 000	____
93	Frequency Counter Display	15	____
104	Frequency Counter Display	256	____
117	Frequency Counter Display	256	____
132	Frequency Counter Display	15	____
142	Frequency Counter Display	256	____
155	Frequency Counter Display	256	____
168	Frequency Counter Display	256	____
181	Frequency Counter Display	256	____

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 5

JDC
NO. 05786
REV. A

JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
197	Pulse Characteristics (XA041)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	____
	b. Pulse Width (B)	3.00 ± 0.25 µsec	____
	c. Backswing (D)	NMT 40% of A	____
	d. Droop (E)	NMT 15% of A	____
	e. Rise Time (C)	NMT 0.2 µsec	____
	f. Noise (F)	NMT 0.4 volt p-p	____
200	Pulse Characteristics (XA047)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	____
	b. Pulse Width (B)	3.00 ± 0.25 µsec	____
	c. Backswing (D)	NMT 40% of A	____
	d. Droop (E)	NMT 15% of A	____
	e. Rise Time (C)	NMT 0.2 µsec	____
	f. Noise (F)	NMT 0.4 volt p-p	____
203	Time Delay	5.0 ± 0.5 msec (X10 Magnifier) or 5.0 ± 1.0 µsec (X5 Magnifier)	____
207	Time Delay (XA041 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	____
209	Time Delay (XA047 FREQ) F05ASB2 & F05ASB0	304 ± 2 µsec	____

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 5

JDC
NO. 05786
REV. A

JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
223	Pulse Characteristics (XA042)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	____
	b. Pulse Width (B)	3.00 ± 0.25 µsec	____
	c. Backswing (D)	NMT 40% of A	____
	d. Droop (E)	NMT 15% of A	____
	e. Rise Time (C)	NMT 0.2 µsec	____
	f. Noise (F)	NMT 0.4 volt p-p	____
226	Time Delay (XA042) F05BSB2 & F05BSB0	304 ± 2 µsec	____
239	Pulse Characteristics (XA048)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	____
	b. Pulse Width (B)	3.00 ± 0.25 µsec	____
	c. Backswing (D)	NMT 40% of A	____
	d. Droop (E)	NMT 15% of A	____
	e. Rise Time (C)	NMT 0.2 µsec	____
	f. Noise (F)	NMT 0.4 volt p-p	____
242	Pulse Characteristics (XA051)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	____
	b. Pulse Width (B)	3.00 ± 0.25 µsec	____
	c. Backswing (D)	NMT 40% of A	____
	d. Droop (E)	NMT 15% of A	____
	e. Rise Time (C)	NMT 0.2 µsec	____

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 5

JDC
NO. 05786
REV. A

JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
	f. Noise (F)	NMT 0.4 volt p-p	
245	Time Delay	5.0 ± 0.5 msec (X10 Magnifier) or 5.0 ± 1.0 msec (X5 Magnifier)	
248	Time Delay (XA043 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
251	Time Delay (XA051 FREQ) F05ASB2 & F05ASB0	304 ± 2 µsec	
265	Pulse Characteristics (XA044)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	
268	Time Delay (XA044 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
282	Pulse Characteristics (XA045)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 5

JDC
NO. 05786
REV. A

JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
284	Time Delay (XA045 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
298	Pulse Characteristics (XA046)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	
300	Time Delay (XA046 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
317	REG SEL Indication	0000 000 000 000 000	
333	RG Indication	0000 000 000 000 111	
336	RG Indication	0000 000 000 000 111	
340	RG Indication	0000 000 000 000 111	
343	RG Indication	0000 000 000 111 000	
364	REG SEL Indication	0000 000 000 000 000	
377	RG Indication	0000 000 000 000 111	
380	RG Indication	0000 000 000 000 111	
384	RG Indication	0000 000 000 000 111	
387	RG Indication	0000 000 000 111 000	

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JOB RADAR SIGNAL MEASUREMENTS TEST

INITIAL TDRR 35464 D.S. PGS 5

SUBSYSTEM Computer

ASSY. Block II C-Computer

DESCRIPTION

Provides procedures for checking the following radar functions:

a) The operation of Channel 13
b) Pulse and phase characteristics of rendevous and landing radar signals
c) The operation of the Radar Counter (EMA 0046) with low one and high zero marginal input pulse levels.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5-3-68	36182	2,3,7,10	1	EA BD	-
B	10-17-68	36908	3,7-10,12	-	EA GP	-

REFERENCES JDC's 05400 through 05405
JDC's 05413, 05414, 05129,
ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

NOTE: Unless otherwise specified, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, Logic Drawer No. 2 panel, and XY Interface Panel of the CTS.

CHANNEL 13 CHECK

3. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

4. Press Keys CL, 00013, 42525.

5. Verify that the RZ display is 0000 000 000 001 011.

6. Verify that the REG SEL display is 0100 010 101 010 101.

7. Press the CHANNEL button.

8. Press the EXECUTE button.

9. Verify that the LINC indicator is on.

10. Press the READ-AGC indicator switch to the on (illuminated) position.

11. Press Keys CL, 0013.

12. Verify that the RZ display is 0000 000 000 001 011.

13. Press the CHANNEL button.

14. Press the EXECUTE button.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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JOB RADAR SIGNAL MEASUREMENTS TEST

JDC 05786 REV B PAGE 2 OF 13

SUBSYSTEM Computer

ASSY Block II-C Computer

15. Verify that the OINC and LINC indicators are on.

16. Verify that the REG SEL display is 1100 010 001 010 101. Stamp data sheet.

17. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

18. Press Keys CL, 00013, 01252.

19. Verify that the RZ display is 0000 000 000 001 011.

20. Verify that the REG SEL display is 0000 001 010 101 010.

21. Press the CHANNEL button.

22. Press the EXECUTE button.

23. Verify that the OINC and LINC indicators are on.

24. Press the READ-AGC indicator switch to the on (illuminated) position.

25. Press Keys CL, 0013.

26. Verify that the RZ display is 0000 000 000 001 011.

27. Press the CHANNEL button.

28. Press the EXECUTE button.

29. Verify that the OINC and LINC indicators are on.

30. Verify that the REG SEL display is 0000 001 010 101 010. Stamp data sheet.

31. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

32. Press Keys CL, 00013, 00000.

33. Verify that the RZ display is 0000 000 000 001 011.

34. Verify that the REG SEL display is 0000 000 000 000 000.

35. Press the CHANNEL button.

36. Press the EXECUTE button.

37. Verify that the OINC and LINC indicators are on.

38. Press the READ-AGC indicator switch to the on (illuminated) position.

39. Press Keys CL, 0013.

40. Verify that the RZ display is 0000 000 000 001 011.

41. Press the CHANNEL button.

42. Press the EXECUTE button.

43. Verify that the OINC and LINC indicators are on.

44. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

45. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

46. Press Keys CL, 00013, 43777.

47. Verify that the RZ display is 0000 000 000 001 011.

48. Verify that the REG SEL display is 0100 011 111 111 111.

49. Press the CHANNEL button.

50. Press the EXECUTE button.

51. Verify that the OINC and LINC indicators are on.

52. Press the READ-AGC indicator switch to the on (illuminated) position.

53. Press Keys CL, 0013.

54. Verify that the RZ display is 0000 000 000 001 011.

55. Press the CHANNEL button.

56. Press the EXECUTE button.

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JOB RADAR SIGNAL MEASUREMENTS TEST

JDC 05786 REV B PAGE 3 OF 13

SUBSYSTEM Computer

ASSY Block II-C Computer

57. Verify that the OINC and LINC indicators are on.

58. Verify that the REG SEL display is 1100 011 011 111 111. Stamp data sheet.

59. Press FRESH START.

60. Deleted.

61. Press Keys CL, 0013.

62. Verify that the RZ display is 0000 000 000 001 011.

63. Press the CHANNEL button.

64. Press the EXECUTE button.

65. Verify that the OINC indicator is on.

66. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

RADAR COUNTERS OUTPUT SIGNAL MEASUREMENT

PREPARATION

67. Verify signal cabling between XY Interface Panel and the Oscilloscope per JDC 05415, step 4.

68. Assure that the STRT1/STRT2 switch on the Buffer Circuit Assembly is set to the ON position.

69. Press the LOAD CHAN S 510 OHMS pushbutton indicator to the on or illuminated state.

70. Press the LOAD CHAN T 510 OHMS pushbutton indicator to the on or illuminated state.

NOTE: Unless specified otherwise, the Oscilloscope and Frequency Counter used to perform this test are to be operated as specified in the applicable JDC (05400 through 05405).

SIGNALS XA041 and XA047

71. Press the KEYBOARD LOAD pushbutton indicator to the on (or illuminated) position.

72. Press the CL Key.

73. Press Keys 00100, 00011.

74. Press EXECUTE.

75. Press Keys CL, 00101, 30100.

76. Press the EXECUTE button.

77. Press Keys CL, 00102, 00006.

78. Press the EXECUTE button.

79. Press Keys CL, 00103, 01013.

80. Press the EXECUTE button.

81. Press Keys CL, 00104, 00104.

82. Press the EXECUTE button.

83. Set the CHANNEL S switches to position 313.

84. Set the FREQ + PHASE switch to the FRS S → T position.

85. Set the Frequency Counter switches as follows: FUNCTION switch to COUNT A, GATE switch to OPEN, FREQ A SLOPE switch to "-". Adjust INPUT VOLTS RMS switches and TRIGGER LEVEL controls as necessary.

NOTE: If counter reading verifications in the forthcoming steps do not read correctly where specified, readjust the INPUT VOLTS RMS switches and/or TRIGGER LEVEL controls as required and repeat preceding steps in that section that causes the counter to update until correct reading can be obtained.

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JOB RADAR SIGNAL MEASUREMENTS TEST

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SUBSYSTEM Computer

ASSY Block II C-Computer

86. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

87. Press Keys CL, 0101.

88. Press the EXECUTE button.

89. Set the T12 COUNTER STOP switch to the OFF position.

90. Press the MONITOR indicator switch to the on (illuminated) position.

91. Press the Frequency Counter RESET button.

92. Press the PROCEED button.

93. Verify a display of 15 on the Frequency Counter. Record on data sheet.

94. Set the T12 COUNTER STOP switch to the ON position.

95. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

96. Press Keys CL, 0101.

97. Press the EXECUTE button.

98. Set the T12 COUNTER STOP to the OFF position.

99. Press the MONITOR indicator switch to the on (illuminated) position.

100. Set the CHANNEL T switch to position 215.

101. Set the FREQ + PHASE switch to the FRT T → S position.

102. Press the RESET button on the Frequency Counter.

103. Press the PROCEED button.

104. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA042

105. Set the T12 COUNTER STOP switch to the ON position.

106. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

107. Press Keys CL, 00100, 00012.

108. Press the EXECUTE button.

109. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

110. Press Keys CL, 0101.

111. Press the EXECUTE button.

112. Set the T12 COUNTER STOP switch to the OFF position.

113. Press the MONITOR indicator switch to the on (illuminated) position.

114. Set the CHANNEL T switches to position 216.

115. Press the RESET button on the Frequency Counter.

116. Press the PROCEED button.

117. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNALS XA061 AND XA043

118. Set the T12 COUNTER STOP switch to the ON position.

119. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

120. Press Keys CL, 00100, 00014.

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121. Press the EXECUTE button.

122. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

123. Press Keys CL, 0101.

124. Press the EXECUTE button.

125. Set the T12 COUNTER STOP switch to the OFF position.

126. Press the MONITOR indicator switch to the on (illuminated) position.

127. Set the CHANNEL S switches to position 314.

128. Set the CHANNEL T switches to position 217.

129. Set the FREQ + PHASE switch to the FRS S → T position.

130. Press the RESET button on the Frequency Counter.

131. Press the PROCEED button.

132. Verify a display of 15 on the Frequency Counter. Record on data sheet.

133. Set the T12 COUNTER STOP switch to the ON position.

134. Set the FREQ + PHASE switch to the FRT T → S position.

135. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

136. Press Keys CL, 0101.

137. Press the EXECUTE button.

138. Set the T12 COUNTER STOP switch to the OFF position.

139. Press the MONITOR indicator switch to the on (illuminated) position.

140. Press the RESET button on the Frequency Counter.

141. Press the PROCEED button.

142. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA044

143. Set the T12 COUNTER STOP switch to the ON position.

144. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

145. Press Keys CL, 00100, 00015.

146. Press the EXECUTE button.

147. Set the CHANNEL T switches for position 218.

148. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

149. Press Keys CL, 0101.

150. Press the EXECUTE button.

151. Set the T12 COUNTER STOP switch to the OFF position.

152. Press the MONITOR indicator switch to the on (illuminated) position.

153. Press the RESET button on the Frequency Counter.

154. Press the PROCEED button.

155. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA045

156. Set the T12 COUNTER STOP switch to the ON position.

157. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

158. Press Keys CL, 00100, 00016.

159. Press the EXECUTE button.

160. Set the CHANNEL T switches for position 219.

161. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

162. Press Keys CL, 0101.

163. Press the EXECUTE button.

164. Set the T12 COUNTER STOP switch to the OFF position.

165. Press the MONITOR indicator switch to the on (illuminated) position.

166. Press the RESET button on the Frequency Counter.

167. Press the PROCEED button.

168. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA046

169. Set the T12 COUNTER STOP switch to the ON position.

170. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

171. Press Keys CL, 00100, 00017.

172. Press the EXECUTE button.

173. Set the CHANNEL T switches for position 220.

174. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

175. Press Keys CL, 0101.

176. Press the EXECUTE button.

177. Set the T12 COUNTER STOP switch to the OFF position.

178. Press the MONITOR indicator switch to the on (illuminated) position.

179. Press the RESET button on the Frequency Counter.

180. Press the PROCEED button.

181. Verify a display of 256 on the Frequency Counter. Record on data sheet.

182. Set the T12 COUNTER STOP switch to the ON position.

PULSE CHARACTERISTICS OF SIGNALS XA041 AND XA047

183. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

184. Press Keys CL, 00100, 00011.

185. Press the EXECUTE button.

186. Press Keys CL, 00104, 00101.

187. Press the EXECUTE button.

188. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

189. Press Keys CL, 0101.

190. Press the EXECUTE button.

---

191. Set the T12 COUNTER STOP switch to the OFF position.

192. Press the MONITOR indicator switch to the on (illuminated) position.

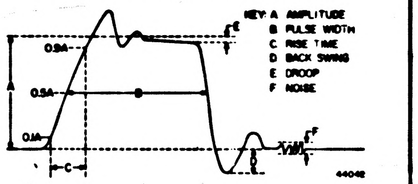
193. Set the FREQ + PHASE switch to the OFF position.

194. Set the SCOPE switch to position DIFF T.

195. Set the CHANNEL T switches for position 215.

196. Set Oscilloscope MODE switch to A + B. Press the PROCEED button.

197. Measure and record the pulse characteristic specified in Figure 1.



NOTE: Slight jitter may be observed on oscilloscope display during pulse measurements. This condition should not be interpreted as indicating a defective interface channel.

Figure 1

198. Set the CHANNEL S switches for position 313.

199. Set the SCOPE switch to position DIFF S.

200. Measure and record the pulse characteristics specified in Figure 1.

201. Set the SCOPE switch to position ALTERNATE S → T.

202. Adjust the Oscilloscope as follows:

a. Provide an external sync from channel A to the NORMAL AND DELAYING TRIGGER EXT TRIG input.

b. Set TIME/CM to 10 msec.

c. Display Logic to NORM.

d. Mode switch to ALT.

203. Use the X5 or X10 Magnifier to measure and record the time delay from the last pulse on CHANNEL T to the first pulse on CHANNEL S.

204. Set the CHANNEL S switches to position 113.

205. Set the FREQ + PHASE switch to position FRT T → S.

206. Set the Frequency Counter switches as follows; the FUNCTION switch to TIME A → B, the GATE switch to AUTO, the FREQ A SLOPE switch to "-" , the STOP SLOPE to "+" and the FREQ-TIME to 0.1 usec position. Adjust stop B trigger level as required.

207. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

208. Set the CHANNEL T switches to position 313.

209. Set the CHANNEL S switches for position 112. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA042

210. Set the T12 COUNTER STOP switch to the ON position.

211. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

212. Press Keys CL, 00100, 00012.

213. Press the EXECUTE button.

214. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

---

215. Press Keys CL, 0101.

216. Press the EXECUTE button.

217. Set the T12 COUNTER STOP switch to the OFF position.

218. Press the MONITOR indicator switch to the on (illuminated) position.

219. Set the FREQ + PHASE switch to the OFF position.

220. Set the SCOPE switch to position DIFF T and SCOPE MODE CONTROL to the A + B position. Set CHANNEL B to INVERT DC position.

221. Set the CHANNEL T switches for position 216.

222. Press the PROCEED button.

223. Measure and record the pulse characteristics specified in Figure 1.

224. Set the CHANNEL S switches for position 113.

225. Set the FREQ + PHASE switch to position FRT T → S.

226. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNALS XA043 AND XA051.

227. Set the T12 COUNTER STOP switch to the ON position.

228. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

229. Press Keys CL, 00100, 00014.

230. Press the EXECUTE button.

231. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

232. Press Keys CL, 0101.

233. Press the EXECUTE button.

234. Set the T12 COUNTER STOP switch to the OFF position.

235. Press the MONITOR indicator switch to the on (illuminated) position.

236. Set the FREQ + PHASE switch to the OFF position.

237. Set the CHANNEL T switches for position 217.

238. Press the PROCEED button.

239. Measure and record the pulse characteristics specified in Figure 1.

240. Set the CHANNEL S switches for position 314.

241. Set the SCOPE switch to the DIFF S position.

242. Measure and record the pulse characteristics specified in Figure 1.

243. Set the SCOPE switch to position ALTERNATE S → T.

244. Adjust the Oscilloscope as follows:

a. Provide an external sync from channel A to the NORMAL AND DELAYING TRIGGER EXT TRIG input.

b. Set TIME/CM to 10 msec.

c. Display Logic to NORM.

d. Mode switch to ALT.

245. Use the X5 and X10 Magnifier to measure and record the time delay from the last pulse on CHANNEL T to the first pulse on CHANNEL S.

246. Set the CHANNEL S switches to position 113.

247. Set the FREQ + PHASE switch to position FRT T → S.

248. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

249. Set the CHANNEL T switches for position 314.

250. Set the CHANNEL S switches for position 112.

251. Measure and record the time delay from the falling edge of CNTR-A signal, and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA044

252. Set the T12 COUNTER STOP switch to the ON position.

253. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

254. Press Keys CL, 00100, 00015.

255. Press the EXECUTE button.

256. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

257. Press Keys CL, 0101.

258. Press the EXECUTE button.

259. Set the T12 COUNTER STOP switch to the OFF position.

260. Press the MONITOR indicator switch to the on (illuminated) position.

261. Set the FREQ + PHASE switch to the OFF position.

262. Set the SCOPE switch to position DIFF T.

263. Set the CHANNEL T switches for position 218.

264. Press the PROCEED button.

265. Measure and record the pulse characteristics specified in Figure 1. Assure that SCOPE MODE control is set to the A + B position.

266. Set the CHANNEL S switches for position 113.

267. Set the FREQ + PHASE switch to the FRT T → S position.

268. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA045

269. Set the T12 COUNTER STOP switch to the ON position.

270. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

271. Press Keys CL, 00100, 00016.

272. Press the EXECUTE button.

273. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

274. Press Keys CL, 0101.

275. Press the EXECUTE button.

276. Set the T12 COUNTER STOP switch to the OFF position.

277. Press the MONITOR indicator switch to the on (illuminated) position.

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278. Set the FREQ + PHASE switch to the OFF position. Assure that the SCOPE MODE control is set to the A + B position.

279. Set the SCOPE switch to the DIFF T position.

280. Set the CHANNEL T switches to position 219.

281. Press the PROCEED button.

282. Measure and record the pulse characteristics specified in Figure 1.

283. Set the FREQ + PHASE switch to position FRT T → S.

284. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS FOR SIGNAL XA046

285. Set the T12 COUNTER STOP switch to the ON position.

286. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

287. Press Keys CL, 00100, 00017.

288. Press the EXECUTE button.

289. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

290. Press Keys CL, 0101.

291. Press the EXECUTE button.

292. Set the T12 COUNTER STOP switch to the OFF position.

293. Press the MONITOR indicator switch to the on (illuminated) position.

294. Set the FREQ + PHASE switch to the OFF position.

295. Set the SCOPE switch to the DIFF T position. Assure that the SCOPE MODE control is set to the A + B position.

296. Set the CHANNEL T switches for position 220.

297. Press the PROCEED button.

298. Measure and record the pulse characteristics specified in Figure 1.

299. Set the FREQ + PHASE switch to the FRT T → S position.

300. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

RADAR COUNTER MARGINAL CHECK

300A. Set T12 COUNTER STOP, INCREMENTS-INHIBIT, and INHIBIT INTERRUPT switches to OFF. Depress FRESH START, PROCEED, ALARM RESET pushbuttons. Depress the DSKY RSET pushbutton. Set INCREMENTS-INHIBIT and INHIBIT INTERRUPT switches to ON.

301. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position, and set the T12 COUNTER STOP switch to the ON position.

302. Press Keys CL, 00100, 00011.

303. Verify that the RZ display is 0000 000 001 000 000.

304. Verify that the REG SEL display is 0000 000 000 001 001.

305. Deleted.

306. Press the EXECUTE button.

307. Verify that the LINC indicator is on.

308. Press Keys CL, 00046, 00000.

---

309. Verify that the RZ display is 0000 000 000 100 110.

310. Verify that the REG SEL display is 0000 000 000 000 000.

311. Press the EXECUTE button.

312. Press the READ AGC indicator switch to the on (illuminated) position.

313. Press Keys CL, 0046.

314. Verify that the RZ display is 0000 000 000 100 110.

315. Press the EXECUTE button.

316. Verify that the OINC indicator is on.

317. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

318. Set the AGREEMENT A switches for XXXX 0046.

319. Set the Agreement A function switch to the SAMPLE position.

320. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

321. Press Keys CL, 0101.

322. Verify that the RZ display is 0000 000 001 000 001.

323. Press the EXECUTE button.

324. Set the AGC INPUT COUNTERS switch to position 11.

325. Set the Y MARGINS switch to the V3 (Low One) position.

326. Press the POSITIVE indicator switch to the on (illuminated) position.

327. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

328. Press the MONITOR indicator switch to the on (illuminated) position.

329. Set the INCREMENTS INHIBIT switch to the OFF position.

330. Set the T12 COUNTER STOP switch to the OFF position.

331. Press the PROCEED button.

332. Press the SINGLE PULSE button three times.

333. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

334. Set the Y MARGINS switch to the V2 (High Zero) position.

335. Press the SINGLE PULSE button three times.

336. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

337. Press the POSITIVE indicator switch to the off (extinguished) position.

338. Press the NEGATIVE indicator switch to the on (illuminated) position.

339. Press the SINGLE PULSE button three times.

340. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

341. Set the Y MARGINS switch to the V3 position.

342. Press the SINGLE PULSE button three times.

343. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

344. Set the T12 COUNTER STOP switch to the ON position.

---

345. Set the INCREMENTS INHIBIT switch to the ON position.

346. Set the Agreement A function switch to the OFF position.

347. Press the NEGATIVE indicator switch to the off (extinguished) position.

348. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

349. Press Keys CL, 00100, 00017.

→ 350. Verify that the RZ display is 0000 000 001 000 000.

351. Verify that the REG SEL display is 0000 000 000 001 111.

352. Deleted.

353. Press the EXECUTE button.

354. Verify that the LINC indicator is on.

355. Press Keys CL, 00046, 00000.

356. Verify that the RZ display is 0000 000 000 100 110.

357. Verify that the REG SEL display is 0000 000 000 000 000.

358. Press the EXECUTE button.

359. Press the READ AGC indicator switch to the on (illuminated) position.

360. Press Keys CL, 0046.

361. Verify that the RZ display is 0000 000 000 100 110.

362. Press the EXECUTE button.

363. Verify that the OINC indicator is on.

364. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

365. Set the Agreement A function switch to the SAMPLE position.

366. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

367. Press Keys CL, 0101.

368. Verify that the RZ display is 0000 000 001 000 001.

369. Press the EXECUTE button.

370. Set the AGC INPUT COUNTERS switch to position 12.

371. Press the POSITIVE indicator switch to the on (illuminated) position.

372. Press the MONITOR indicator switch to the on (illuminated) position.

373. Set the INCREMENTS INHIBIT switch to the OFF position.

374. Set the T12 COUNTER STOP switch to the OFF position.

375. Press the PROCEED button.

376. Press the SINGLE PULSE button three times.

377. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

378. Set the Y MARGINS switch to the V2 (High Zero) position.

379. Press the SINGLE PULSE button three times.

380. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

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381. Press the POSITIVE indicator switch to the off (extinguished) position.

382. Press the NEGATIVE indicator switch to the on (illuminated) position.

383. Press the SINGLE PULSE button three times.

384. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

385. Set the Y MARGINS switch to the V3 position.

386. Press the SINGLE PULSE button three times.

387. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

388. Set the T12 COUNTER STOP switch to the ON position.

389. Set the INCREMENTS INHIBIT switch to the ON position.

390. Set the Agreement A function switch to the OFF position.

391. Set the Y MARGINS switch to the NORM position.

392. Press the NEGATIVE indicator switch to the off (extinguished) position.

393. Press the SINGLE PULSE indicator switch to the off (extinguished) position.

394. Set the AGC INPUT COUNTERS switch to position 1.

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JOB RADAR SIGNAL MEASUREMENTS TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE ______

NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION

APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
16	REG SEL Indication	1100 010 001 010 101	
30	REG SEL Indication	0000 001 010 101 010	
44	REG SEL Indication	0000 000 000 000 000	
58	REG SEL Indication	1100 011 011 111 111	
66	REG SEL Indication	0000 000 000 000 000	
93	Frequency Counter Display	15	
104	Frequency Counter Display	256	
117	Frequency Counter Display	256	
132	Frequency Counter Display	15	
142	Frequency Counter Display	256	
155	Frequency Counter Display	256	
168	Frequency Counter Display	256	
181	Frequency Counter Display	256	

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Step	Parameter	Specification	Results
197	Pulse Characteristics (XA041)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p	
200	Pulse Characteristics (XA047)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p	
203	Time Delay	5.0 ± 0.5 msec (X10 Magnifier) or 5.0 ± 1.0 μsec (X5 Magnifier)	
207	Time Delay (XA041 FREQ) F05BSB2 & F05BSB0	304 ± 2 μsec	
209	Time Delay (XA047 FREQ) F05ASB2 & F05ASB0	304 ± 2 μsec	

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Step	Parameter	Specification	Results
223	Pulse Characteristics (XA042)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p	
226	Time Delay (XA042) F05BSB2 & F05BSB0	304 ± 2 μsec	
239	Pulse Characteristics (XA043)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p	
242	Pulse Characteristics (XA051)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	

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Step	Parameter	Specification	Results
	f. Noise (F)	NMT 0.4 volt p-p	
245	Time Delay	5.0 ± 0.5 msec (X10 Magnifier) or 5.0 ± 1.0 msec (X5 Magnifier)	
248	Time Delay (XA043 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
251	Time Delay (XA051 FREQ) F05ASB2 & F05ASB0	304 ± 2 µsec	
265	Pulse Characteristics (XA044)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	
268	Time Delay (XA044 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
282	Pulse Characteristics (XA045)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	

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Step	Parameter	Specification	Results
284	Time Delay (XA045 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
298	Pulse Characteristics (XA046)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0. 2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	
300	Time Delay (XA046 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
317	REG SEL Indication	0000 000 000 000 000	
333	RG Indication	0000 000 000 000 111	
336	RG Indication	0000 000 000 000 111	
340	RG Indication	0000 000 000 000 111	
343	RG Indication	0000 000 000 111 000	
364	REG SEL Indication	0000 000 000 000 000	
377	RG Indication	0000 000 000 000 111	
380	RG Indication	0000 000 000 000 111	
384	RG Indication	0000 000 000 000 111	
387	RG Indication	0000 000 000 111 000	

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INITIAL TDRR 35464 D.S. PGS 1

JOB RADAR SIGNAL MEASUREMENTS TEST

SUBSYSTEM Computer

ASSY. Block II-C Computer

DESCRIPTION

Provides procedures for checking the following radar functions:

a) The operation of Channel 13
b) Pulse and phase characteristics of rendevous and landing radar signals
c) The operation of the Radar Counter (EMA 0046) with low one and high zero marginal input pulse levels.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5-3-68	36182	2, 3, 7, 10	1	EA	-
B	10-17-68	36908	3, 7-10, 12	-	EA	-
C	12 30 68	37167	3, 11	-	EA	-

REFERENCES JDC's 05400 through 05405 JDC's 05413, 05414, 05129, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

NOTE: Unless otherwise specified, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, Logic Drawer No. 2 panel, and XY Interface Panel of the CTS.

CHANNEL 13 CHECK

3. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

4. Press Keys CL, 00013, 42525.

5. Verify that the RZ display is 0000 000 000 001 011.

6. Verify that the REG SEL display is 0100 010 101 010 101.

7. Press the CHANNEL button.

8. Press the EXECUTE button.

9. Verify that the LINC indicator is on.

10. Press the READ-AGC indicator switch to the on (illuminated) position.

11. Press Keys CL, 0013.

12. Verify that the RZ display is 0000 000 000 001 011.

13. Press the CHANNEL button.

14. Press the EXECUTE button.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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15. Verify that the OINC and LINC indicators are on.

16. Verify that the REG SEL display is 1100 010 001 010 101. Stamp data sheet.

17. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

18. Press Keys CL, 00013, 01252.

19. Verify that the RZ display is 0000 000 000 001 011.

20. Verify that the REG SEL display is 0000 001 010 101 010.

21. Press the CHANNEL button.

22. Press the EXECUTE button.

23. Verify that the OINC and LINC indicators are on.

24. Press the READ-AGC indicator switch to the on (illuminated) position.

25. Press Keys CL, 0013.

26. Verify that the RZ display is 0000 000 000 001 011.

27. Press the CHANNEL button.

28. Press the EXECUTE button.

29. Verify that the OINC and LINC indicators are on.

30. Verify that the REG SEL display is 0000 001 010 101 010. Stamp data sheet.

31. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

32. Press Keys CL, 00013, 00000.

33. Verify that the RZ display is 0000 000 000 001 011.

34. Verify that the REG SEL display is 0000 000 000 000 000.

35. Press the CHANNEL button.

36. Press the EXECUTE button.

37. Verify that the OINC and LINC indicators are on.

38. Press the READ-AGC indicator switch to the on (illuminated) position.

39. Press Keys CL, 0013.

40. Verify that the RZ display is 0000 000 000 001 011.

41. Press the CHANNEL button.

42. Press the EXECUTE button.

43. Verify that the OINC and LINC indicators are on.

44. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

45. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

46. Press Keys CL, 00013, 43777.

47. Verify that the RZ display is 0000 000 000 001 011.

48. Verify that the REG SEL display is 0100 011 111 111 111.

49. Press the CHANNEL button.

50. Press the EXECUTE button.

51. Verify that the OINC and LINC indicators are on.

52. Press the READ-AGC indicator switch to the on (illuminated) position.

53. Press Keys CL, 0013.

54. Verify that the RZ display is 0000 000 000 001 011.

55. Press the CHANNEL button.

56. Press the EXECUTE button.

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SUBSYSTEM Computer | ASSY Block II-C Computer

57. Verify that the OINC and LINC indicators are on.

57a. Verify STANDBY and RESTART on the DSKY are ON.

58. Verify that the REG SEL display is 1100 011 011 111 111. Stamp data sheet.

59. Press FRESH START.

60. Verify STANDBY on the DSKY is out - press and hold RSET on the DSKY and verify RESTART goes out. The RESTART will illuminate when RSET is released.

61. Press Keys CL, 0013.

62. Verify that the RZ display is 0000 000 000 001 011.

63. Press the CHANNEL button.

64. Press the EXECUTE button.

65. Verify that the OINC indicator is on.

66. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

RADAR COUNTERS OUTPUT SIGNAL MEASUREMENT

PREPARATION

67. Verify signal cabling between XY Interface Panel and the Oscilloscope per JDC 05415, step 4.

68. Assure that the STRT1/STRT2 switch on the Buffer Circuit Assembly is set to the ON position.

69. Press the LOAD CHAN S 510 OHMS pushbutton indicator to the on or illuminated state.

70. Press the LOAD CHAN T 510 OHMS pushbutton indicator to the on or illuminated state.

NOTE: Unless specified otherwise, the Oscilloscope and Frequency Counter used to perform this test are to be operated as specified in the applicable JDC (05400 through 05405).

SIGNALS XA041 and XA047

71. Press the KEYBOARD LOAD pushbutton indicator to the on (or illuminated) position.

72. Press the CL Key.

73. Press Keys 00100, 00011.

74. Press EXECUTE.

75. Press Keys CL, 00101, 30100.

76. Press the EXECUTE button.

77. Press Keys CL, 00102, 00006.

78. Press the EXECUTE button.

79. Press Keys CL, 00103, 01013.

80. Press the EXECUTE button.

81. Press Keys CL, 00104, 00104.

82. Press the EXECUTE button.

83. Set the CHANNEL S switches to position 313.

84. Set the FREQ + PHASE switch to the FRS S → T position.

85. Set the Frequency Counter switches as follows: FUNCTION switch to COUNT A, GATE switch to OPEN, FREQ A SLOPE switch to "-". Adjust INPUT VOLTS RMS switches and TRIGGER LEVEL controls as necessary.

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NOTE: If counter reading verifications in the forthcoming steps do not read correctly where specified, readjust the INPUT VOLTS RMS switches and/or TRIGGER LEVEL controls as required and repeat preceding steps in that section that causes the counter to update until correct reading can be obtained.

86. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

87. Press Keys CL, 0101.

88. Press the EXECUTE button.

89. Set the T12 COUNTER STOP switch to the OFF position.

90. Press the MONITOR indicator switch to the on (illuminated) position.

91. Press the Frequency Counter RESET button.

92. Press the PROCEED button.

93. Verify a display of 15 on the Frequency Counter. Record on data sheet.

94. Set the T12 COUNTER STOP switch to the ON position.

95. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

96. Press Keys CL, 0101.

97. Press the EXECUTE button.

98. Set the T12 COUNTER STOP to the OFF position.

99. Press the MONITOR indicator switch to the on (illuminated) position.

100. Set the CHANNEL T switch to position 215.

101. Set the FREQ + PHASE switch to the FRT T → S position.

102. Press the RESET button on the Frequency Counter.

103. Press the PROCEED button.

104. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA042

105. Set the T12 COUNTER STOP switch to the ON position.

106. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

107. Press Keys CL, 00100, 00012.

108. Press the EXECUTE button.

109. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

110. Press Keys CL, 0101.

111. Press the EXECUTE button.

112. Set the T12 COUNTER STOP switch to the OFF position.

113. Press the MONITOR indicator switch to the on (illuminated) position.

114. Set the CHANNEL T switches to position 216.

115. Press the RESET button on the Frequency Counter.

116. Press the PROCEED button.

117. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNALS XA051 AND XA043

118. Set the T12 COUNTER STOP switch to the ON position.

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119. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

120. Press Keys CL, 00100, 00014.

121. Press the EXECUTE button.

122. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

123. Press Keys CL, 0101.

124. Press the EXECUTE button.

125. Set the T12 COUNTER STOP switch to the OFF position.

126. Press the MONITOR indicator switch to the on (illuminated) position.

127. Set the CHANNEL S switches to position 314.

128. Set the CHANNEL T switches to position 217.

129. Set the FREQ + PHASE switch to the FRS S → T position.

130. Press the RESET button on the Frequency Counter.

131. Press the PROCEED button.

132. Verify a display of 15 on the Frequency Counter. Record on data sheet.

133. Set the T12 COUNTER STOP switch to the ON position.

134. Set the FREQ + PHASE switch to the FRT T → S position.

135. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

136. Press Keys CL, 0101.

137. Press the EXECUTE button.

138. Set the T12 COUNTER STOP switch to the OFF position.

139. Press the MONITOR indicator switch to the on (illuminated) position.

140. Press the RESET button on the Frequency Counter.

141. Press the PROCEED button.

142. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA044

143. Set the T12 COUNTER STOP switch to the ON position.

144. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

145. Press Keys CL, 00100, 00015.

146. Press the EXECUTE button.

147. Set the CHANNEL T switches for position 218.

148. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

149. Press Keys CL, 0101.

150. Press the EXECUTE button.

151. Set the T12 COUNTER STOP switch to the OFF position.

152. Press the MONITOR indicator switch to the on (illuminated) position.

153. Press the RESET button on the Frequency Counter.

154. Press the PROCEED button.

155. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA045

156. Set the T12 COUNTER STOP switch to the ON position.

157. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

158. Press Keys CL, 00100, 00016.

159. Press the EXECUTE button.

160. Set the CHANNEL T switches for position 219.

161. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

162. Press Keys CL, 0101.

163. Press the EXECUTE button.

164. Set the T12 COUNTER STOP switch to the OFF position.

165. Press the MONITOR indicator switch to the on (illuminated) position.

166. Press the RESET button on the Frequency Counter.

167. Press the PROCEED button.

168. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA046

169. Set the T12 COUNTER STOP switch to the ON position.

170. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

171. Press Keys CL, 00100, 00017.

172. Press the EXECUTE button.

173. Set the CHANNEL T switches for position 220.

174. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

175. Press Keys CL, 0101.

176. Press the EXECUTE button.

177. Set the T12 COUNTER STOP switch to the OFF position.

178. Press the MONITOR indicator switch to the on (illuminated) position.

179. Press the RESET button on the Frequency Counter.

180. Press the PROCEED button.

181. Verify a display of 256 on the Frequency Counter. Record on data sheet.

182. Set the T12 COUNTER STOP switch to the ON position.

PULSE CHARACTERISTICS OF SIGNALS XA041 AND XA047

183. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

184. Press Keys CL, 00100, 00011.

185. Press the EXECUTE button.

186. Press Keys CL, 00104, 00101.

187. Press the EXECUTE button.

188. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

189. Press Keys CL, 0101.

190. Press the EXECUTE button.

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191. Set the T12 COUNTER STOP switch to the OFF position.

192. Press the MONITOR indicator switch to the on (illuminated) position.

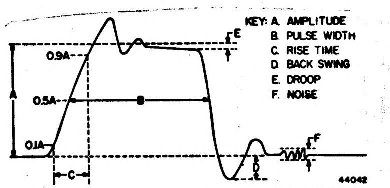
193. Set the FREQ + PHASE switch to the OFF position.

194. Set the SCOPE switch to position DIFF T.

195. Set the CHANNEL T switches for position 215.

196. Set Oscilloscope MODE switch to A + B. Press the PROCEED button.

197. Measure and record the pulse characteristic specified in Figure 1.



NOTE: Slight jitter may be observed on oscilloscope display during pulse measurements. This condition should not be interpreted as indicating a defective interface channel.

Figure 1

198. Set the CHANNEL S switches for position 313.

199. Set the SCOPE switch to position DIFF S.

200. Measure and record the pulse characteristics specified in Figure 1.

201. Set the SCOPE switch to position ALTERNATE S → T.

202. Adjust the Oscilloscope as follows:

a. Provide an external sync from channel A to the NORMAL AND DELAYING TRIGGER EXT TRIG input.

b. Set TIME/CM to 10 msec.

c. Display Logic to NORM.

d. Mode switch to ALT.

203. Use the X5 or X10 Magnifier to measure and record the time delay from the last pulse on CHANNEL T to the first pulse on CHANNEL S.

204. Set the CHANNEL S switches to position 113.

205. Set the FREQ + PHASE switch to position FRT T → S.

206. Set the Frequency Counter switches as follows; the FUNCTION switch to TIME A → B, the GATE switch to AUTO. the FREQ A SLOPE switch to "-" , the STOP SLOPE to "+" and the FREQ-TIME to 0.0 usec position. Adjust stop B trigger level as required.

207. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

208. Set the CHANNEL T switches to position 313.

209. Set the CHANNEL S switches for position 112. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA042

210. Set the T12 COUNTER STOP switch to the ON position.

211. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

212. Press Keys CL, 00100, 00012.

213. Press the EXECUTE button.

214. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

---

215. Press Keys CL, 0101.

216. Press the EXECUTE button.

217. Set the T12 COUNTER STOP switch to the OFF position.

218. Press the MONITOR indicator switch to the on (illuminated) position.

219. Set the FREQ + PHASE switch to the OFF position.

220. Set the SCOPE switch to position DIFF T and SCOPE MODE CONTROL to the A + B position. Set CHANNEL B to INVERT DC position.

221. Set the CHANNEL T switches for position 216.

222. Press the PROCEED button.

223. Measure and record the pulse characteristics specified in Figure 1.

224. Set the CHANNEL S switches for position 113.

225. Set the FREQ + PHASE switch to position FRT T → S.

226. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNALS XA043 AND XA051.

227. Set the T12 COUNTER STOP switch to the ON position.

228. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

229. Press Keys CL, 00100, 00014.

230. Press the EXECUTE button.

231. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

232. Press Keys CL, 0101.

233. Press the EXECUTE button.

234. Set the T12 COUNTER STOP switch to the OFF position.

235. Press the MONITOR indicator switch to the on (illuminated) position.

236. Set the FREQ + PHASE switch to the OFF position.

237. Set the CHANNEL T switches for position 217.

238. Press the PROCEED button.

239. Measure and record the pulse characteristics specified in Figure 1.

240. Set the CHANNEL S switches for position 314.

241. Set the SCOPE switch to the DIFF S position.

242. Measure and record the pulse characteristics specified in Figure 1.

243. Set the SCOPE switch to position ALTERNATE S → T.

244. Adjust the Oscilloscope as follows:

a. Provide an external sync from channel A to the NORMAL AND DELAYING TRIGGER EXT TRIG input.

b. Set TIME/CM to 10 msec.

c. Display Logic to NORM.

d. Mode switch to ALT.

245. Use the X5 and X10 Magnifier to measure and record the time delay from the last pulse on CHANNEL T to the first pulse on CHANNEL S.

246. Set the CHANNEL S switches to position 113.

247. Set the FREQ + PHASE switch to position FRT T → S.

248. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

249. Set the CHANNEL T switches for position 314.

250. Set the CHANNEL S switches for position 112.

251. Measure and record the time delay from the falling edge of CNTR-A signal, and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA044

252. Set the T12 COUNTER STOP switch to the ON position.

253. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

254. Press Keys CL, 00100, 00015.

255. Press the EXECUTE button.

256. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

257. Press Keys CL, 0101.

258. Press the EXECUTE button.

259. Set the T12 COUNTER STOP switch to the OFF position.

260. Press the MONITOR indicator switch to the on (illuminated) position.

261. Set the FREQ + PHASE switch to the OFF position.

262. Set the SCOPE switch to position DIFF T.

263. Set the CHANNEL T switches for position 218.

264. Press the PROCEED button.

265. Measure and record the pulse characteristics specified in Figure 1. Assure that SCOPE MODE control is set to the A + B position.

266. Set the CHANNEL S switches for position 113.

267. Set the FREQ + PHASE switch to the FRT T → S position.

268. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA045

269. Set the T12 COUNTER STOP switch to the ON position.

270. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

271. Press Keys CL, 00100, 00016.

272. Press the EXECUTE button.

273. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

274. Press Keys CL, 0101.

275. Press the EXECUTE button.

276. Set the T12 COUNTER STOP switch to the OFF position.

277. Press the MONITOR indicator switch to the on (illuminated) position.

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278. Set the FREQ + PHASE switch to the OFF position. Assure that the SCOPE MODE control is set to the A + B position.

279. Set the SCOPE switch to the DIFF T position.

280. Set the CHANNEL T switches to position 219.

281. Press the PROCEED button.

282. Measure and record the pulse characteristics specified in Figure 1.

283. Set the FREQ + PHASE switch to position FRT T → S.

284. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS FOR SIGNAL XA046

285. Set the T12 COUNTER STOP switch to the ON position.

286. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

287. Press Keys CL, 00100, 00017.

288. Press the EXECUTE button.

289. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

290. Press Keys CL, 0101.

291. Press the EXECUTE button.

292. Set the T12 COUNTER STOP switch to the OFF position.

293. Press the MONITOR indicator switch to the on (illuminated) position.

294. Set the FREQ + PHASE switch to the OFF position.

295. Set the SCOPE switch to the DIFF T position. Assure that the SCOPE MODE control is set to the A + B position.

296. Set the CHANNEL T switches for position 220.

297. Press the PROCEED button.

298. Measure and record the pulse characteristics specified in Figure 1.

299. Set the FREQ + PHASE switch to the FRT T → S position.

300. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

RADAR COUNTER MARGINAL CHECK

300A. Set T12 COUNTER STOP, INCREMENTS-INHIBIT, and INHIBIT INTERRUPT switches to OFF. Depress FRESH START, PROCEED, ALARM RESET pushbuttons. Depress the DSKY RSET pushbutton. Set INCREMENTS-INHIBIT and INHIBIT INTERRUPT switches to ON.

301. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position, and set the T12 COUNTER STOP switch to the ON position.

302. Press Keys CL, 00100, 00011.

303. Verify that the RZ display is 0000 000 001 000 000.

304. Verify that the REG SEL display is 0000 000 000 001 001.

305. Deleted.

306. Press the EXECUTE button.

307. Verify that the LINC indicator is on.

308. Press Keys CL, 00046, 00000.

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309. Verify that the RZ display is 0000 000 000 100 110.

310. Verify that the REG SEL display is 0000 000 000 000 000.

311. Press the EXECUTE button.

312. Press the READ AGC indicator switch to the on (illuminated) position.

313. Press Keys CL, 0046.

314. Verify that the RZ display is 0000 000 000 100 110.

315. Press the EXECUTE button.

316. Verify that the OINC indicator is on.

317. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

318. Set the AGREEMENT A switches for XXXX 0046.

319. Set the Agreement A function switch to the SAMPLE position.

320. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

321. Press Keys CL, 0101.

322. Verify that the RZ display is 0000 000 001 000 001.
001

323. Press the EXECUTE button.

324. Set the AGC INPUT COUNTERS switch to position 11.

325. Set the Y MARGINS switch to the V3 (Low One) position.

326. Press the POSITIVE indicator switch to the on (illuminated) position.

327. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

328. Press the MONITOR indicator switch to the on (illuminated) position.

329. Set the INCREMENTS INHIBIT switch to the OFF position.

330. Set the T12 COUNTER STOP switch to the OFF position.

331. Sequentially depress Proceed & Alarm Reset. Verify CTS Alarm 1 & 6 are on (number 9 remains on, then goes off).

332. Press the SINGLE PULSE button three times.

333. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

334. Set the Y MARGINS switch to the V2 (High Zero) position.

335. Press the SINGLE PULSE button three times.

336. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

337. Press the POSITIVE indicator switch to the off (extinguished) position.

338. Press the NEGATIVE indicator switch to the on (illuminated) position.

339. Press the SINGLE PULSE button three times.

340. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

341. Set the Y MARGINS switch to the V3 position.

342. Press the SINGLE PULSE button three times.

343. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

344. Set the T12 COUNTER STOP switch to the ON position.

---

345. Set the INCREMENTS INHIBIT switch to the ON position.

346. Set the Agreement A function switch to the OFF position.

347. Press the NEGATIVE indicator switch to the off (extinguished) position.

348. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

349. Press Keys CL, 00100, 00017.

→ 350. Verify that the RZ display is 0000 000 001 000 000.

351. Verify that the REG SEL display is 0000 000 000 001 111.

352. Deleted.

353. Press the EXECUTE button.

354. Verify that the LINC indicator is on.

355. Press Keys CL, 00046, 00000.

356. Verify that the RZ display is 0000 000 000 100 110.

357. Verify that the REG SEL display is 0000 000 000 000 000.

358. Press the EXECUTE button.

359. Press the READ AGC indicator switch to the on (illuminated) position.

360. Press Keys CL, 0046.

361. Verify that the RZ display is 0000 000 000 100 110.

362. Press the EXECUTE button.

363. Verify that the OINC indicator is on.

364. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

365. Set the Agreement A function switch to the SAMPLE position.

366. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

367. Press Keys CL, 0101.

368. Verify that the RZ display is 0000 000 001 000 001.
001 001

369. Press the EXECUTE button.

370. Set the AGC INPUT COUNTERS switch to position 12.

371. Press the POSITIVE indicator switch to the on (illuminated) position.

372. Press the MONITOR indicator switch to the on (illuminated) position.

373. Set the INCREMENTS INHIBIT switch to the OFF position.

374. Set the T12 COUNTER STOP switch to the OFF position.

375. Press the PROCEED button.

376. Press the SINGLE PULSE button three times.

377. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

378. Set the Y MARGINS switch to the V2 (High Zero) position.

379. Press the SINGLE PULSE button three times.

380. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

SUBSYSTEM Computer | **ASSY** Block II C-Computer

381. Press the POSITIVE indicator switch to the off (extinguished) position.

382. Press the NEGATIVE indicator switch to the on (illuminated) position.

383. Press the SINGLE PULSE button three times.

384. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

385. Set the Y MARGINS switch to the V3 position.

386. Press the SINGLE PULSE button three times.

387. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

388. Set the T12 COUNTER STOP switch to the ON position.

389. Set the INCREMENTS INHIBIT switch to the ON position.

390. Set the Agreement A function switch to the OFF position.

391. Set the Y MARGINS switch to the NORM position.

392. Press the NEGATIVE indicator switch to the off (extinguished) position.

393. Press the SINGLE PULSE indicator switch to the off (extinguished) position.

394. Set the AGC INPUT COUNTERS switch to position 1.

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EQUIPMENT TEST
DATA SHEET 1 OF 5

NO. 05786 JDC
REV. C
INITIAL TDRR 35464

JOB RADAR SIGNAL MEASUREMENTS TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION   APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
16	REG SEL Indication	1100 010 001 010 101	
30	REG SEL Indication	0000 001 010 101 010	
44	REG SEL Indication	0000 000 000 000 000	
58	REG SEL Indication	1100 011 011 111 111	
66	REG SEL Indication	0000 000 000 000 000	
93	Frequency Counter Display	15	
104	Frequency Counter Display	256	
117	Frequency Counter Display	256	
132	Frequency Counter Display	15	
142	Frequency Counter Display	256	
155	Frequency Counter Display	256	
168	Frequency Counter Display	256	
181	Frequency Counter Display	256	

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EQUIPMENT TEST
DATA SHEET 2 OF 5

JDC
NO. 05786
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JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
197	Pulse Characteristics (XA041)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	
200	Pulse Characteristics (XA047)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	
203	Time Delay	5.0 ± 0.5 msec (X10 Magnifier) or 5.0 ± 1.0 µsec (X5 Magnifier)	
207	Time Delay (XA041 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
209	Time Delay (XA047 FREQ) F05ASB2 & F05ASB0	304 ± 2 µsec	

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JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
223	Pulse Characteristics (XA042)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	
226	Time Delay (XA042) F05BSB2 & F05BSB0	304 ± 2 µsec	
239	Pulse Characteristics (XA043)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	
242	Pulse Characteristics (XA051)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	

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EQUIPMENT TEST
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Step	Parameter	Specification	Results
	f. Noise (F)	NMT 0.4 volt p-p	
245	Time Delay	5.0 ± 0.5 msec (X10 Magnifier) or 5.0 ± 1.0 msec (X5 Magnifier)	
248	Time Delay (XA043 FREQ) F05BSB2 & F05BSB0	304 ± 2 μsec	
251	Time Delay (XA051 FREQ) F05ASB2 & F05ASB0	304 ± 2 μsec	
265	Pulse Characteristics (XA044)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p	
268	Time Delay (XA044 FREQ) F05BSB2 & F05BSB0	304 ± 2 μsec	
282	Pulse Characteristics (XA045)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p	

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EQUIPMENT TEST
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JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
284	Time Delay (XA045 FREQ) F05BSB2 & F05BSB0	304 ± 2 μsec	
298	Pulse Characteristics (XA046)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0. 2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p	
300	Time Delay (XA046 FREQ) F05BSB2 & F05BSB0	304 ± 2 μsec	
317	REG SEL Indication	0000 000 000 000 000	
333	RG Indication	0000 000 000 000 111	
336	RG Indication	0000 000 000 000 111	
340	RG Indication	0000 000 000 000 111	
343	RG Indication	0000 000 000 111 000	
364	REG SEL Indication	0000 000 000 000 000	
377	RG Indication	0000 000 000 000 111	
380	RG Indication	0000 000 000 000 111	
384	RG Indication	0000 000 000 000 111	
387	RG Indication	0000 000 000 111 000	

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INITIAL TDRR 35464 D.S. PGS 5

JOB RADAR SIGNAL MEASUREMENTS TEST

SUBSYSTEM Computer
ASSY. Block II-C Computer

DESCRIPTION

Provides procedures for checking the following radar functions:

a) The operation of Channel 13
b) Pulse and phase characteristics of rendevous and landing radar signals
c) The operation of the Radar Counter (EMA 0046) with low one and high zero marginal input pulse levels.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5-3-68	36182	2, 3, 7, 10	1	EA	-
B	10-17-68	36908	3, 7-10, 12	-	EA	-
C	12 30 68	37167	3, 11	-	EA	-
D	2-22-69	37361	3, 7, 10	-	EA	-

REFERENCES JDC's 05400 through 05405
JDC's 05413, 05414, 05129,
ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

NOTE: Unless otherwise specified, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, Logic Drawer No. 2 panel, and XY Interface Panel of the CTS.

CHANNEL 13 CHECK

3. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

4. Press Keys CL, 00013, 42525.

5. Verify that the RZ display is 0000 000 000 001 011.

6. Verify that the REG SEL display is 0100 010 101 010 101.

7. Press the CHANNEL button.

8. Press the EXECUTE button.

9. Verify that the LINC indicator is on.

10. Press the READ-AGC indicator switch to the on (illuminated) position.

11. Press Keys CL, 0013.

12. Verify that the RZ display is 0000 000 000 001 011.

13. Press the CHANNEL button.

14. Press the EXECUTE button.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 18 JAN 68

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15. Verify that the OINC and LINC indicators are on.

16. Verify that the REG SEL display is 1100 010 001 010 101. Stamp data sheet.

17. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

18. Press Keys CL, 00013, 01252.

19. Verify that the RZ display is 0000 000 000 001 011.

20. Verify that the REG SEL display is 0000 001 010 101 010.

21. Press the CHANNEL button.

22. Press the EXECUTE button.

23. Verify that the OINC and LINC indicators are on.

24. Press the READ-AGC indicator switch to the on (illuminated) position.

25. Press Keys CL, 0013.

26. Verify that the RZ display is 0000 000 000 001 011.

27. Press the CHANNEL button.

28. Press the EXECUTE button.

29. Verify that the OINC and LINC indicators are on.

30. Verify that the REG SEL display is 0000 001 010 101 010. Stamp data sheet.

31. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

32. Press Keys CL, 00013, 00000.

33. Verify that the RZ display is 0000 000 000 001 011.

33. Verify that the REG SEL display is 0000 000 000 000 000.

35. Press the CHANNEL button.

36. Press the EXECUTE button.

37. Verify that the OINC and LINC indicators are on.

38. Press the READ-AGC indicator switch to the on (illuminated) position.

39. Press Keys CL, 0013.

40. Verify that the RZ display is 0000 000 000 001 011.

41. Press the CHANNEL button.

42. Press the EXECUTE button.

43. Verify that the OINC and LINC indicators are on.

44. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

45. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

46. Press Keys CL, 00013, 43777.

47. Verify that the RZ display is 0000 000 000 001 011.

48. Verify that the REG SEL display is 0100 011 111 111 111.

49. Press the CHANNEL button.

50. Press the EXECUTE button.

51. Verify that the OINC and LINC indicators are on.

52. Press the READ-AGC indicator switch to the on (illuminated) position.

53. Press Keys CL, 0013.

54. Verify that the RZ display is 0000 000 000 001 011.

55. Press the CHANNEL button.

56. Press the EXECUTE button.

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57. Verify that the OINC and LINC indicators are on.

57a. Verify STANDBY and RESTART on the DSKY are ON.

58. Verify that the REG SEL display is 1100 011 011 111 111. Stamp data sheet.

59. Press FRESH START.

60. Verify STANDBY on the DSKY is out; press RSET on the DSKY and verify RESTART goes out.

61. Press Keys CL, 0013.

62. Verify that the RZ display is 0000 000 000 001 011.

63. Press the CHANNEL button.

64. Press the EXECUTE button.

65. Verify that the OINC indicator is on.

66. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

RADAR COUNTERS OUTPUT SIGNAL MEASUREMENT

PREPARATION

67. Verify signal cabling between XY Interface Panel and the Oscilloscope per JDC 05415, step 4.

68. Assure that the STRT1/STRT2 switch on the Buffer Circuit Assembly is set to the ON position.

69. Press the LOAD CHAN S 510 OHMS pushbutton indicator to the on or illuminated state.

70. Press the LOAD CHAN T 510 OHMS pushbutton indicator to the on or illuminated state.

NOTE: Unless specified otherwise, the Oscilloscope and Frequency Counter used to perform this test are to be operated as specified in the applicable JDC (05400 through 05405).

SIGNALS XA041 and XA047

71. Press the KEYBOARD LOAD pushbutton indicator to the on (or illuminated) position.

72. Press the CL Key.

73. Press Keys 00100, 00011.

74. Press EXECUTE.

75. Press Keys CL, 00101, 30100.

76. Press the EXECUTE button.

77. Press Keys CL, 00102, 00006.

78. Press the EXECUTE button.

79. Press Keys CL, 00103, 01013.

80. Press the EXECUTE button.

81. Press Keys CL, 00104, 00104.

82. Press the EXECUTE button.

83. Set the CHANNEL S switches to position 313.

84. Set the FREQ + PHASE switch to the FRS S → T position.

85. Set the Frequency Counter switches as follows: FUNCTION switch to COUNT A, GATE switch to OPEN, FREQ A SLOPE switch to "-". Adjust INPUT VOLTS RMS switches and TRIGGER LEVEL controls as necessary.

NOTE: If counter reading verifications in the forthcoming steps do not read correctly where specified, readjust the INPUT VOLTS RMS switches and/or TRIGGER LEVEL controls as required and repeat preceding steps in that section that causes the counter to update until correct reading can be obtained.

86. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

87. Press Keys CL, 0101.

88. Press the EXECUTE button.

89. Set the T12 COUNTER STOP switch to the OFF position.

90. Press the MONITOR indicator switch to the on (illuminated) position.

91. Press the Frequency Counter RESET button.

92. Press the PROCEED button.

93. Verify a display of 15 on the Frequency Counter. Record on data sheet.

94. Set the T12 COUNTER STOP switch to the ON position.

95. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

96. Press Keys CL, 0101.

97. Press the EXECUTE button.

98. Set the T12 COUNTER STOP to the OFF position.

99. Press the MONITOR indicator switch to the on (illuminated) position.

100. Set the CHANNEL T switch to position 215.

101. Set the FREQ + PHASE switch to the FRT T → S position.

102. Press the RESET button on the Frequency Counter.

103. Press the PROCEED button.

104. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA042

105. Set the T12 COUNTER STOP switch to the ON position.

106. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

107. Press Keys CL, 00100, 00012.

108. Press the EXECUTE button.

109. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

110. Press Keys CL, 0101.

111. Press the EXECUTE button.

112. Set the T12 COUNTER STOP switch to the OFF position.

113. Press the MONITOR indicator switch to the on (illuminated) position.

114. Set the CHANNEL T switches to position 216.

115. Press the RESET button on the Frequency Counter.

116. Press the PROCEED button.

117. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNALS XA051 AND XA043

118. Set the T12 COUNTER STOP switch to the ON position.

119. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

120. Press Keys CL, 00100, 00014.

121. Press the EXECUTE button.

122. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

123. Press Keys CL, 0101.

124. Press the EXECUTE button.

125. Set the T12 COUNTER STOP switch to the OFF position.

126. Press the MONITOR indicator switch to the on (illuminated) position.

127. Set the CHANNEL S switches to position 314.

128. Set the CHANNEL T switches to position 217.

129. Set the FREQ + PHASE switch to the FRS S → T position.

130. Press the RESET button on the Frequency Counter.

131. Press the PROCEED button.

132. Verify a display of 15 on the Frequency Counter. Record on data sheet.

133. Set the T12 COUNTER STOP switch to the ON position.

134. Set the FREQ + PHASE switch to the FRT T → S position.

135. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

136. Press Keys CL, 0101.

137. Press the EXECUTE button.

138. Set the T12 COUNTER STOP switch to the OFF position.

139. Press the MONITOR indicator switch to the on (illuminated) position.

140. Press the RESET button on the Frequency Counter.

141. Press the PROCEED button.

142. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA044

143. Set the T12 COUNTER STOP switch to the ON position.

144. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

145. Press Keys CL, 00100, 00015.

146. Press the EXECUTE button.

147. Set the CHANNEL T switches for position 218.

148. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

149. Press Keys CL, 0101.

150. Press the EXECUTE button.

151. Set the T12 COUNTER STOP switch to the OFF position.

152. Press the MONITOR indicator switch to the on (illuminated) position.

153. Press the RESET button on the Frequency Counter.

154. Press the PROCEED button.

155. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA045

156. Set the T12 COUNTER STOP switch to the ON position.

157. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

158. Press Keys CL, 00100, 00016.

159. Press the EXECUTE button.

160. Set the CHANNEL T switches for position 219.

161. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

162. Press Keys CL, 0101.

163. Press the EXECUTE button.

164. Set the T12 COUNTER STOP switch to the OFF position.

165. Press the MONITOR indicator switch to the on (illuminated) position.

166. Press the RESET button on the Frequency Counter.

167. Press the PROCEED button.

168. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA046

169. Set the T12 COUNTER STOP switch to the ON position.

170. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

171. Press Keys CL, 00100, 00017.

172. Press the EXECUTE button.

173. Set the CHANNEL T switches for position 220.

174. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

175. Press Keys CL, 0101.

176. Press the EXECUTE button.

177. Set the T12 COUNTER STOP switch to the OFF position.

178. Press the MONITOR indicator switch to the on (illuminated) position.

179. Press the RESET button on the Frequency Counter.

180. Press the PROCEED button.

181. Verify a display of 256 on the Frequency Counter. Record on data sheet.

182. Set the T12 COUNTER STOP switch to the ON position.

PULSE CHARACTERISTICS OF SIGNALS XA041 AND XA047

183. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

184. Press Keys CL, 00100, 00011.

185. Press the EXECUTE button.

186. Press Keys CL, 00104, 00101.

187. Press the EXECUTE button.

188. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

189. Press Keys CL, 0101.

190. Press the EXECUTE button.

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191. Set the T12 COUNTER STOP switch to the OFF position.

192. Press the MONITOR indicator switch to the on (illuminated) position.

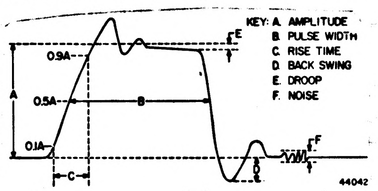
193. Set the FREQ + PHASE switch to the OFF position.

194. Set the SCOPE switch to position DIFF T.

195. Set the CHANNEL T switches for position 215.

196. Set Oscilloscope MODE switch to A + B. Press the PROCEED button.

197. Measure and record the pulse characteristic specified in Figure 1.



NOTE: Slight jitter may be observed on oscilloscope display during pulse measurements. This condition should not be interpreted as indicating a defective interface channel.

Figure 1

198. Set the CHANNEL S switches for position 313.

199. Set the SCOPE switch to position DIFF S.

200. Measure and record the pulse characteristics specified in Figure 1.

201. Set the SCOPE switch to position ALTERNATE S → T.

202. Adjust the Oscilloscope as follows:

- a. Provide an external sync from channel A to the NORMAL AND DELAYING TRIGGER EXT TRIG input.
- b. Set TIME/CM to 10 msec.
- c. Display Logic to NORM.
- d. Mode switch to ALT.

203. Use the X5 or X10 Magnifier to measure and record the time delay from the last pulse on CHANNEL T to the first pulse on CHANNEL S.

204. Set the CHANNEL S switches to position 113.

205. Set the FREQ + PHASE switch to position FRT T → S.

206. Set the Frequency Counter switches as follows; the FUNCTION switch to TIME A → B, the GATE switch to AUTO. the FREQ A SLOPE switch to "-" , the STOP SLOPE to "+" and the FREQ-TIME to 0.1 usec position. Adjust stop B trigger level as required.

207. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

208. Set the CHANNEL T switches to position 313.

209. Set the CHANNEL S switches for position 112. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA042

210. Set the T12 COUNTER STOP switch to the ON position.

211. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

212. Press Keys CL, 00100, 00012.

213. Press the EXECUTE button.

214. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

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215. Press Keys CL, 0101.

216. Press the EXECUTE button.

217. Set the T12 COUNTER STOP switch to the OFF position.

218. Press the MONITOR indicator switch to the on (illuminated) position.

219. Set the FREQ + PHASE switch to the OFF position.

220. Set the SCOPE switch to position DIFF T and SCOPE MODE CONTROL to the A + B position. Set CHANNEL B to INVERT DC position.

221. Set the CHANNEL T switches for position 216.

222. Press the PROCEED button.

223. Measure and record the pulse characteristics specified in Figure 1.

224. Set the CHANNEL S switches for position 113.

225. Set the FREQ + PHASE switch to position FRT T → S.

226. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNALS XA043 AND XA051.

227. Set the T12 COUNTER STOP switch to the ON position.

228. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

229. Press Keys CL, 00100, 00014.

230. Press the EXECUTE button.

231. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

232. Press Keys CL, 0101.

233. Press the EXECUTE button.

234. Set the T12 COUNTER STOP switch to the OFF position.

235. Press the MONITOR indicator switch to the on (illuminated) position.

236. Set the FREQ + PHASE switch to the OFF position.

237. Set the CHANNEL T switches for position 217.

238. Press the PROCEED button.

239. Measure and record the pulse characteristics specified in Figure 1.

240. Set the CHANNEL S switches for position 314.

241. Set the SCOPE switch to the DIFF S position.

242. Measure and record the pulse characteristics specified in Figure 1.

243. Set the SCOPE switch to position ALTERNATE S → T.

244. Adjust the Oscilloscope as follows:

- a. Provide an external sync from channel A to the NORMAL AND DELAYING TRIGGER EXT TRIG input.
- b. Set TIME/CM to 10 msec.
- c. Display Logic to NORM.
- d. Mode switch to ALT.

245. Use the X5 and X10 Magnifier to measure and record the time delay from the last pulse on CHANNEL T to the first pulse on CHANNEL S.

SUBSYSTEM Computer | **ASSY** Block II C-Computer

381. Press the POSITIVE indicator switch to the off (extinguished) position.

382. Press the NEGATIVE indicator switch to the on (illuminated) position.

383. Press the SINGLE PULSE button three times.

384. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

385. Set the Y MARGINS switch to the V3 position.

386. Press the SINGLE PULSE button three times.

387. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

388. Set the T12 COUNTER STOP switch to the ON position.

389. Set the INCREMENTS INHIBIT switch to the ON position.

390. Set the Agreement A function switch to the OFF position.

391. Set the Y MARGINS switch to the NORM position.

392. Press the NEGATIVE indicator switch to the off (extinguished) position.

393. Press the SINGLE PULSE indicator switch to the off (extinguished) position.

394. Set the AGC INPUT COUNTERS switch to position 1.

DATE 18 JAN 68

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 5

JDC
NO. 05786
REV. D
INITIAL TDRR 35464

JOB RADAR SIGNAL MEASUREMENTS TEST

ASSEMBLY UNDER TEST

TITLE ____________

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______________________ SER. NO. ______ CAL DATE

NAME ______________________ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION ______ APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
16	REG SEL Indication	1100 010 001 010 101	
30	REG SEL Indication	0000 001 010 101 010	
44	REG SEL Indication	0000 000 000 000 000	
58	REG SEL Indication	1100 011 011 111 111	
66	REG SEL Indication	0000 000 000 000 000	
93	Frequency Counter Display	15	
104	Frequency Counter Display	256	
117	Frequency Counter Display	256	
132	Frequency Counter Display	15	
142	Frequency Counter Display	256	
155	Frequency Counter Display	256	
168	Frequency Counter Display	256	
181	Frequency Counter Display	256	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 5

JDC
NO. 05786
REV. D

JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
197	Pulse Characteristics (XA041)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p	
200	Pulse Characteristics (XA047)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p	
203	Time Delay	5.0 ± 0.5 msec (X10 Magnifier) or 5.0 ± 1.0 μsec (X5 Magnifier)	
207	Time Delay (XA041 FREQ) F05BSB2 & F05BSB0	304 ± 2 μsec	
209	Time Delay (XA047 FREQ) F05ASB2 & F05ASB0	304 ± 2 μsec	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 5

JDC
NO. 05786
REV. D

JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
223	Pulse Characteristics (XA042)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p volts	
226	Time Delay (XA042) F05BSB2 & F05BSB0	304 ± 2 μsec	
239	Pulse Characteristics (XA043)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p .115	
242	Pulse Characteristics (XA051)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 **OF** 5

JDC
NO. 05786
REV. D

JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
	f. Noise (F)	NMT 0.4 volt p-p	
245	Time Delay	5.0 ± 0.5 msec (X10 Magnifier) or 5.0 ± 1.0 msec (X5 Magnifier)	
248	Time Delay (XA043 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
251	Time Delay (XA051 FREQ) F05ASB2 & F05ASB0	304 ± 2 µsec	
265	Pulse Characteristics (XA044)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	
268	Time Delay (XA044 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
282	Pulse Characteristics (XA045)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 5 **OF** 5

JDC
NO. 05786
REV. D

JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
284	Time Delay (XA045 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
298	Pulse Characteristics (XA046)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 µsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 µsec	
	f. Noise (F)	NMT 0.4 volt p-p	
300	Time Delay (XA046 FREQ) F05BSB2 & F05BSB0	304 ± 2 µsec	
317	REG SEL Indication	0000 000 000 000 000	
333	RG Indication	0000 000 000 000 111	
336	RG Indication	0000 000 000 000 111	
340	RG Indication	0000 000 000 000 111	
343	RG Indication	0000 000 000 111 000	
364	REG SEL Indication	0000 000 000 000 000	
377	RG Indication	0000 000 000 000 111	
380	RG Indication	0000 000 000 000 111	
384	RG Indication	0000 000 000 000 111	
387	RG Indication	0000 000 000 111 000	

JOB RADAR SIGNAL MEASUREMENTS TEST

JDC 05786 REV. ____ PAGE 1 OF 13

INITIAL TDRR 35464 D.S. PGS 5

SUBSYSTEM Computer

ASSY. Block II C-Computer

DESCRIPTION

Provides procedures for checking the following radar functions:

a) The operation of Channel 13
b) Pulse and phase characteristics of rendevous and landing radar signals
c) The operation of the Radar Counter (EMA 0046) with low one and high zero marginal input pulse levels.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA

REFERENCES JDC's 05400 through 05405 JDC's 05413, 05414, 05129, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

NOTE: Unless otherwise specified, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, Logic Drawer No. 2 panel, and XY Interface Panel of the CTS.

CHANNEL 13 CHECK

3. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

4. Press Keys CL, 00013, 42525.

5. Verify that the RZ display is 0000 000 000 001 011.

6. Verify that the REG SEL display is 0100 010 101 010 101.

7. Press the CHANNEL button.

8. Press the EXECUTE button.

9. Verify that the LINC indicator is on.

10. Press the READ-AGC indicator switch to the on (illuminated) position.

11. Press Keys CL, 0013.

12. Verify that the RZ display is 0000 000 000 001 011.

13. Press the CHANNEL button.

14. Press the EXECUTE button.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ____________

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15. Verify that the OINC indicator is on.

16. Verify that the REG SEL display is 1100 010 101 010 101. Stamp data sheet.

17. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

18. Press Keys CL, 00013, 01252.

19. Verify that the RZ display is 0000 000 000 001 011.

20. Verify that the REG SEL display is 0000 001 010 101 010.

21. Press the CHANNEL button.

22. Press the EXECUTE button.

23. Verify that the LINC indicator is on.

24. Press the READ-AGC indicator switch to the on (illuminated) position.

25. Press Keys CL, 0013.

26. Verify that the RZ display is 0000 000 000 001 011.

27. Press the CHANNEL button.

28. Press the EXECUTE button.

29. Verify that the OINC indicator is on.

30. Verify that the REG SEL display is 0000 001 010 101 010. Stamp data sheet.

31. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

32. Press Keys CL, 00013, 00000.

33. Verify that the RZ display is 0000 000 000 001 011.

34. Verify that the REG SEL display is 0000 000 000 000 000.

35. Press the CHANNEL button.

36. Press the EXECUTE button.

37. Verify that the LINC indicator is on.

38. Press the READ-AGC indicator switch to the on (illuminated) position.

39. Press Keys CL, 0013.

40. Verify that the RZ display is 0000 000 000 001 011.

41. Press the CHANNEL button.

42. Press the EXECUTE button.

43. Verify that the OINC indicator is on.

44. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

45. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

46. Press Keys CL, 00013, 43777.

47. Verify that the RZ display is 0000 000 000 001 011.

48. Verify that the REG SEL display is 0100 011 111 111 111.

49. Press the CHANNEL button.

50. Press the EXECUTE button.

51. Verify that the LINC indicator is on.

52. Press the READ-AGC indicator switch to the on (illuminated) position.

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53. Press Keys CL, 0013.

54. Verify that the RZ display is 0000 000 000 001 011.

55. Press the CHANNEL button.

56. Press the EXECUTE button.

57. Verify that the OINC indicator is on.

58. Verify that the REG SEL display is 1100 011 111 111 111. Stamp data sheet.

59. Press FRESH START.

60. Press the READ-AGC indicator switch to the on (illuminated) position.

61. Press Keys CL, 0013.

62. Verify that the RZ display is 0000 000 000 001 011.

63. Press the CHANNEL button.

64. Press the EXECUTE button.

65. Verify that the OINC indicator is on.

66. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

RADAR COUNTERS OUTPUT SIGNAL MEASUREMENT

PREPARATION

67. Inspect the signal cabling between the XY Interface Panel and the Frequency Counter and Oscilloscope Panel for the connections specified in JDC 05129, step 12.

68. Set the STRT1/STRT2 switch on the Buffer Circuit Assembly to the ON position.

69. Press the LOAD CHAN S 510 OHMS pushbutton indicator to the on or illuminated state.

70. Press the LOAD CHAN T 510 OHMS pushbutton indicator to the on or illuminated state.

NOTE: Unless specified otherwise, the Oscilloscope and Frequency Counter used to perform this test are to be operated as specified in the applicable JDC (05400 through 05405).

SIGNALS XA041 and XA047

71. Press the KEYBOARD LOAD pushbutton indicator to the on (or illuminated) position.

72. Press the CL Key.

73. Press Keys 00100, 00011.

74. Press EXECUTE.

75. Press Keys CL, 00101, 30100.

76. Press the EXECUTE button.

77. Press Keys CL, 00102, 00006.

78. Press the EXECUTE button.

79. Press Keys CL, 00103, 01013.

80. Press the EXECUTE button.

81. Press Keys CL, 00104, 00104.

82. Press the EXECUTE button.

83. Set the CHANNEL S switches to position 313.

84. Set the FREQ + PHASE switch to the FRS S → T position.

85. Set the Frequency Counter switches as follows; the FUNCTION switch to COUNT A, the GATE switch to OPEN, and the FREQ A SLOPE switch to "+".

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86. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

87. Press Keys CL, 0101.

88. Press the EXECUTE button.

89. Set the T12 COUNTER STOP switch to the OFF position.

90. Press the MONITOR indicator switch to the on (illuminated) position.

91. Press the Frequency Counter RESET button.

92. Press the PROCEED button.

93. Verify a display of 15 on the Frequency Counter. Record on data sheet.

94. Set the T12 COUNTER STOP switch to the ON position.

95. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

96. Press Keys CL, 0101.

97. Press the EXECUTE button.

98. Set the T12 COUNTER STOP to the OFF position.

99. Press the MONITOR indicator switch to the on (illuminated) position.

100. Set the CHANNEL T switch to position 215.

101. Set the FREQ + PHASE switch to the FRT T → S position.

102. Press the RESET button on the Frequency Counter.

103. Press the PROCEED button.

104. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA042

105. Set the T12 COUNTER STOP switch to the ON position.

106. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

107. Press Keys CL, 00100, 00012.

108. Press the EXECUTE button.

109. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

110. Press Keys CL, 0101.

111. Press the EXECUTE button.

112. Set the T12 COUNTER STOP switch to the OFF position.

113. Press the MONITOR indicator switch to the on (illuminated) position.

114. Set the CHANNEL T switches to position 216.

115. Press the RESET button on the Frequency Counter.

116. Press the PROCEED button.

117. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNALS XA051 AND XA043

118. Set the T12 COUNTER STOP switch to the ON position.

119. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

120. Press Keys CL, 00100, 00014.

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121. Press the EXECUTE button.

122. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

123. Press Keys CL, 0101.

124. Press the EXECUTE button.

125. Set the T12 COUNTER STOP switch to the OFF position.

126. Press the MONITOR indicator switch to the on (illuminated) position.

127. Set the CHANNEL S switches to position 314.

128. Set the CHANNEL T switches to position 217.

129. Set the FREQ + PHASE switch to the FRS S → T position.

130. Press the RESET button on the Frequency Counter.

131. Press the PROCEED button.

132. Verify a display of 15 on the Frequency Counter. Record on data sheet.

133. Set the T12 COUNTER STOP switch to the ON position.

134. Set the FREQ + PHASE switch to the FRT T → S position.

135. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

136. Press Keys CL, 0101.

137. Press the EXECUTE button.

138. Set the T12 COUNTER STOP switch to the OFF position.

139. Press the MONITOR indicator switch to the on (illuminated) position.

140. Press the RESET button on the Frequency Counter.

141. Press the PROCEED button.

142. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA044

143. Set the T12 COUNTER STOP switch to the ON position.

144. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

145. Press Keys CL, 00100, 00015.

146. Press the EXECUTE button.

147. Set the CHANNEL T switches for position 218.

148. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

149. Press Keys CL, 0101.

150. Press the EXECUTE button.

151. Set the T12 COUNTER STOP switch to the OFF position.

152. Press the MONITOR indicator switch to the on (illuminated) position.

153. Press the RESET button on the Frequency Counter.

154. Press the PROCEED button.

155. Verify a display of 256 on the Frequency Counter. Record on data sheet.

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SIGNAL XA045

156. Set the T12 COUNTER STOP switch to the ON position.

157. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

158. Press Keys CL, 00100, 00016.

159. Press the EXECUTE button.

160. Set the CHANNEL T switches for position 219.

161. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

162. Press Keys CL, 0101.

163. Press the EXECUTE button.

164. Set the T12 COUNTER STOP switch to the OFF position.

165. Press the MONITOR indicator switch to the on (illuminated) position.

166. Press the RESET button on the Frequency Counter.

167. Press the PROCEED button.

168. Verify a display of 256 on the Frequency Counter. Record on data sheet.

SIGNAL XA046

169. Set the T12 COUNTER STOP switch to the ON position.

170. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

171. Press Keys CL, 00100, 00017.

172. Press the EXECUTE button.

173. Set the CHANNEL T switches for position 220.

174. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

175. Press Keys CL, 0101.

176. Press the EXECUTE button.

177. Set the T12 COUNTER STOP switch to the OFF position.

178. Press the MONITOR indicator switch to the on (illuminated) position.

179. Press the RESET button on the Frequency Counter.

180. Press the PROCEED button.

181. Verify a display of 256 on the Frequency Counter. Record on data sheet.

182. Set the T12 COUNTER STOP switch to the ON position.

PULSE CHARACTERISTICS OF SIGNALS XA041 AND XA047

183. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

184. Press Keys CL, 00100, 00011.

185. Press the EXECUTE button.

186. Press Keys CL, 00104, 00101.

187. Press the EXECUTE button.

188. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

189. Press Keys CL, 0101.

190. Press the EXECUTE button.

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191. Set the T12 COUNTER STOP switch to the OFF position.

192. Press the MONITOR indicator switch to the on (illuminated) position.

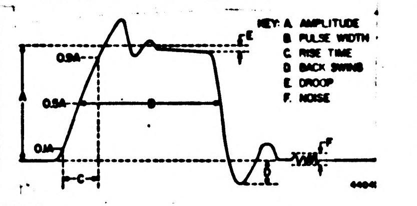
193. Set the FREQ + PHASE switch to the OFF position.

194. Set the SCOPE switch to position DIFF T.

195. Set the CHANNEL T switches for position 215.

196. Press the PROCEED button.

197. Measure and record the pulse characteristic specified in Figure 1.



NOTE: Slight jitter may be observed on oscilloscope display during pulse measurements. This condition should not be interpreted as indicating a defective interface channel.

Figure 1

198. Set the CHANNEL S switches for position 313.

199. Set the SCOPE switch to position DIFF S.

200. Measure and record the pulse characteristics specified in Figure 1.

201. Set the SCOPE switch to position ALTERNATE S → T.

202. Adjust the Oscilloscope as follows:

a. Provide an external sync from channel A to the NORMAL AND DELAYING TRIGGER EXT TRIG input.

b. Set TIME/CM to 10 msec.

c. Display Logic to NORM.

d. Mode switch to ALT.

203. Use the X5 or X10 Magnifier to measure and record the time delay from the last pulse on CHANNEL T to the first pulse on CHANNEL S.

204. Set the CHANNEL S switches to position 113.

205. Set the FREQ + PHASE switch to position FRT T → S.

206. Set the Frequency Counter switches as follows; the FUNCTION switch to TIME A → B, the GATE switch to AUTO, the FREQ A SLOPE switch to "-" and the STOP SLOPE to "+".

207. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

208. Set the CHANNEL T switches to position 313.

209. Set the CHANNEL S switches for position 112. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA042

210. Set the T12 COUNTER STOP switch to the ON position.

211. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

212. Press Keys CL, 00100, 00012.

213. Press the EXECUTE button.

214. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

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215. Press Keys CL, 0101.

216. Press the EXECUTE button.

217. Set the T12 COUNTER STOP switch to the OFF position.

218. Press the MONITOR indicator switch to the on (illuminated) position.

219. Set the FREQ + PHASE switch to the OFF position.

220. Set the SCOPE switch to position DIFF T.

221. Set the CHANNEL T switches for position 216.

222. Press the PROCEED button.

223. Measure and record the pulse characteristics specified in Figure 1.

224. Set the CHANNEL S switches for position 113.

225. Set the FREQ + PHASE switch to position FRT T → S.

226. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNALS XA043 AND XA051.

227. Set the T12 COUNTER STOP switch to the ON position.

228. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

229. Press Keys CL, 00100, 00014.

230. Press the EXECUTE button.

231. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

232. Press Keys CL, 0101.

233. Press the EXECUTE button.

234. Set the T12 COUNTER STOP switch to the OFF position.

235. Press the MONITOR indicator switch to the on (illuminated) position.

236. Set the FREQ + PHASE switch to the OFF position.

237. Set the CHANNEL T switches for position 217.

238. Press the PROCEED button.

239. Measure and record the pulse characteristics specified in Figure 1.

240. Set the CHANNEL S switches for position 314.

241. Set the SCOPE switch to the DIFF S position.

242. Measure and record the pulse characteristics specified in Figure 1.

243. Set the SCOPE switch to position ALTERNATE S → T.

244. Adjust the Oscilloscope as follows:

a. Provide an external sync from channel A to the NORMAL AND DELAYING TRIGGER EXT TRIG input.

b. Set TIME/CM to 10 msec.

c. Display Logic to NORM.

d. Mode switch to ALT.

245. Use the X5 and X10 Magnifier to measure and record the time delay from the last pulse on CHANNEL T to the first pulse on CHANNEL S.

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246. Set the CHANNEL S switches to position 113.

247. Set the FREQ + PHASE switch to position FRT T → S.

248. Measure and record the time delay from the falling edge of CNTR-A signal to the rising edge of the CNTR-B signal.

249. Set the CHANNEL T switches for position 314.

250. Set the CHANNEL S switches for position 112.

251. Measure and record the time delay from the falling edge of CNTR-A signal, and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA044

252. Set the T12 COUNTER STOP switch to the ON position.

253. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

254. Press Keys CL, 00100, 00015.

255. Press the EXECUTE button.

256. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

257. Press Keys CL, 0101.

258. Press the EXECUTE button.

259. Set the T12 COUNTER STOP switch to the OFF position.

260. Press the MONITOR indicator switch to the on (illuminated) position.

261. Set the FREQ + PHASE switch to the OFF position.

262. Set the SCOPE switch to position DIFF T.

263. Set the CHANNEL T switches for position 218.

264. Press the PROCEED button.

265. Measure and record the pulse characteristics specified in Figure 1.

266. Set the CHANNEL S switches for position 113.

267. Set the FREQ + PHASE switch to the FRT T → S position.

268. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS OF SIGNAL XA045

269. Set the T12 COUNTER STOP switch to the ON position.

270. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

271. Press Keys CL, 00100, 00016.

272. Press the EXECUTE button.

273. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

274. Press Keys CL, 0101.

275. Press the EXECUTE button.

276. Set the T12 COUNTER STOP switch to the OFF position.

277. Press the MONITOR indicator switch to the on (illuminated) position.

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278. Set the FREQ + PHASE switch to the OFF position.

279. Set the SCOPE switch to the DIFF T position.

280. Set the CHANNEL T switches to position 219.

281. Press the PROCEED button.

282. Measure and record the pulse characteristics specified in Figure 1.

283. Set the FREQ + PHASE switch to position FRT T → S.

284. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

PULSE CHARACTERISTICS FOR SIGNAL XA046

285. Set the T12 COUNTER STOP switch to the ON position.

286. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

287. Press Keys CL, 00100, 00017.

288. Press the EXECUTE button.

289. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

290. Press Keys CL, 0101.

291. Press the EXECUTE button.

292. Set the T12 COUNTER STOP switch to the OFF position.

293. Press the MONITOR indicator switch to the on (illuminated) position.

294. Set the FREQ + PHASE switch to the OFF position.

295. Set the SCOPE switch to the DIFF T position.

296. Set the CHANNEL T switches for position 220.

297. Press the PROCEED button.

298. Measure and record the pulse characteristics specified in Figure 1.

299. Set the FREQ + PHASE switch to the FRT T → S position.

300. Measure and record the time delay from the falling edge of CNTR-A signal and the rising edge of the CNTR-B signal.

RADAR COUNTER MARGINAL CHECK

301. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position, and set the T12 COUNTER STOP switch to the ON position.

302. Press Keys CL, 00100, 00011.

303. Verify that the RZ display is 0000 000 001 000 000.

304. Verify that the REG SEL display is 0000 000 000 001 001.

305. Press the CHANNEL button.

306. Press the EXECUTE button.

307. Verify that the LINC indicator is on.

308. Press Keys CL, 00046, 00000.

309. Verify that the RZ display is 0000 000 000 100 110.

310. Verify that the REG SEL display is 0000 000 000 000 000.

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311. Press the EXECUTE button.

312. Press the READ AGC indicator switch to the on (illuminated) position.

313. Press Keys CL, 0046.

314. Verify that the RZ display is 0000 000 000 100 110.

315. Press the EXECUTE button.

316. Verify that the OINC indicator is on.

317. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

318. Set the AGREEMENT A switches for XXXX 0046.

319. Set the Agreement A function switch to the SAMPLE position.

320. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

321. Press Keys CL, 0101.

322. Verify that the RZ display is 0000 000 001 000 001.

323. Press the EXECUTE button.

324. Set the AGC INPUT COUNTERS switch to position 11.

325. Set the Y MARGINS switch to the V3 (Low One) position.

326. Press the POSITIVE indicator switch to the on (illuminated) position.

327. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

328. Press the MONITOR indicator switch to the on (illuminated) position.

329. Set the INCREMENTS INHIBIT switch to the OFF position.

330. Set the T12 COUNTER STOP switch to the OFF position.

331. Press the PROCEED button.

332. Press the SINGLE PULSE button three times.

333. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

334. Set the Y MARGINS switch to the V2 (High Zero) position.

335. Press the SINGLE PULSE button three times.

336. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

337. Press the POSITIVE indicator switch to the off (extinguished) position.

338. Press the NEGATIVE indicator switch to the on (illuminated) position.

339. Press the SINGLE PULSE button three times.

340. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

341. Set the Y MARGINS switch to the V3 position.

342. Press the SINGLE PULSE button three times.

343. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

344. Set the T12 COUNTER STOP switch to the ON position.

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345. Set the INCREMENTS INHIBIT switch to the ON position.

346. Set the Agreement A function switch to the OFF position.

347. Press the NEGATIVE indicator switch to the off (extinguished) position.

348. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

349. Press Keys CL, 00100, 00017.

350. Verify that the RZ display is 0000 000 001 000 000.

351. Verify that the REG SEL display is 0000 000 000 001 111.

352. Press the CHANNEL button.

353. Press the EXECUTE button.

354. Verify that the LINC indicator is on.

355. Press Keys CL, 00046, 00000.

356. Verify that the RZ display is 0000 000 000 100 110.

357. Verify that the REG SEL display is 0000 000 000 000 000.

358. Press the EXECUTE button.

359. Press the READ AGC indicator switch to the on (illuminated) position.

360. Press Keys CL, 0046.

361. Verify that the RZ display is 0000 000 000 100 110.

362. Press the EXECUTE button.

363. Verify that the OINC indicator is on.

364. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

365. Set the Agreement A function switch to the SAMPLE position.

366. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

367. Press Keys CL, 0101.

368. Verify that the RZ display is 0000 000 001 000 001.

369. Press the EXECUTE button.

370. Set the AGC INPUT COUNTERS switch to position 12.

371. Press the POSITIVE indicator switch to the on (illuminated) position.

372. Press the MONITOR indicator switch to the on (illuminated) position.

373. Set the INCREMENTS INHIBIT switch to the OFF position.

374. Set the T12 COUNTER STOP switch to the OFF position.

375. Press the PROCEED button.

376. Press the SINGLE PULSE button three times.

377. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

378. Set the Y MARGINS switch to the V2 (High Zero) position.

379. Press the SINGLE PULSE button three times.

380. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

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SUBSYSTEM Computer | **ASSY** Block II C-Computer

381. Press the POSITIVE indicator switch to the off (extinguished) position.

382. Press the NEGATIVE indicator switch to the on (illuminated) position.

383. Press the SINGLE PULSE button three times.

384. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

385. Set the Y MARGINS switch to the V3 position.

386. Press the SINGLE PULSE button three times.

387. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

388. Set the T12 COUNTER STOP switch to the ON position.

389. Set the INCREMENTS INHIBIT switch to the ON position.

390. Set the Agreement A function switch to the OFF position.

391. Set the Y MARGINS switch to the NORM position.

392. Press the NEGATIVE indicator switch to the off (extinguished) position.

393. Press the SINGLE PULSE indicator switch to the off (extinguished) position.

394. Set the AGC INPUT COUNTERS switch to position 1.

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 5

JDC
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INITIAL TDRR 35464

JOB RADAR SIGNAL MEASUREMENTS TEST

ASSEMBLY UNDER TEST

TITLE ________

SER. NO. ________ DWG ________ REV. ________

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION

TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ CAL DATE ________

NAME ________ SER. NO. ________ CAL DATE ________

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

Step	Parameter	Specification	Results
16	REG SEL Indication	1100 010 101 010 101	________
30	REG SEL Indication	0000 001 010 101 010	________
44	REG SEL Indication	0000 000 000 000 000	________
58	REG SEL Indication	1100 011 111 111 111	________
66	REG SEL Indication	0000 000 000 000 000	________
93	Frequency Counter Display	15	________
104	Frequency Counter Display	256	________
117	Frequency Counter Display	256	________
132	Frequency Counter Display	15	________
142	Frequency Counter Display	256	________
155	Frequency Counter Display	256	________
168	Frequency Counter Display	256	________
181	Frequency Counter Display	256	________

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 5

JDC
NO. 05786
REV. ____

JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
197	Pulse Characteristics (XA041)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	________
	b. Pulse Width (B)	3.00 ± 0.25 μsec	________
	c. Backswing (D)	NMT 40% of A	________
	d. Droop (E)	NMT 15% of A	________
	e. Rise Time (C)	NMT 0.2 μsec	________
	f. Noise (F)	NMT 0.4 volt p-p	________
200	Pulse Characteristics (XA047)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	________
	b. Pulse Width (B)	3.00 ± 0.25 μsec	________
	c. Backswing (D)	NMT 40% of A	________
	d. Droop (E)	NMT 15% of A	________
	e. Rise Time (C)	NMT 0.2 μsec	________
	f. Noise (F)	NMT 0.4 volt p-p	________
203	Time Delay	5.0 ± 0.5 msec (X10 Magnifier) or 5.0 ± 1.0 μsec (X5 Magnifier)	________
207	Time Delay (XA041 FREQ) F05BSB2 & F05BSB0	304 ± 2 μsec	________
209	Time Delay (XA047 FREQ) F05ASB2 & F05ASB0	304 ± 2 μsec	________

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 5

JDC
NO. 05786
REV. ____

JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
223	Pulse Characteristics (XA042)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	________
	b. Pulse Width (B)	3.00 ± 0.25 μsec	________
	c. Backswing (D)	NMT 40% of A	________
	d. Droop (E)	NMT 15% of A	________
	e. Rise Time (C)	NMT 0.2 μsec	________
	f. Noise (F)	NMT 0.4 volt p-p	________
226	Time Delay (XA042) F05BSB2 & F05BSB0	304 ± 2 μsec	________
239	Pulse Characteristics (XA043)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	________
	b. Pulse Width (B)	3.00 ± 0.25 μsec	________
	c. Backswing (D)	NMT 40% of A	________
	d. Droop (E)	NMT 15% of A	________
	e. Rise Time (C)	NMT 0.2 μsec	________
	f. Noise (F)	NMT 0.4 volt p-p	________
242	Pulse Characteristics (XA051)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	________
	b. Pulse Width (B)	3.00 ± 0.25 μsec	________
	c. Backswing (D)	NMT 40% of A	________
	d. Droop (E)	NMT 15% of A	________
	e. Rise Time (C)	NMT 0.2 μsec	________

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 5

JDC
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JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
	f. Noise (F)	NMT 0.4 volt p-p	
245	Time Delay	5.0 ± 0.5 msec (X10 Magnifier) or 5.0 ± 1.0 msec (X5 Magnifier)	
248	Time Delay (XA043 FREQ) F05BSB2 & F05BSB0	304 ± 2 μsec	
251	Time Delay (XA051 FREQ) F05ASB2 & F05ASB0	304 ± 2 μsec	
265	Pulse Characteristics (XA044)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p	
268	Time Delay (XA044 FREQ) F05BSB2 & F05BSB0	304 ± 2 μsec	
282	Pulse Characteristics (XA045)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p	

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 5

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NO. 05786
REV. ____

JOB RADAR SIGNAL MEASUREMENTS TEST

Step	Parameter	Specification	Results
284	Time Delay (XA045 FREQ) F05BSB2 & F05BSB0	304 ± 2 μsec	
298	Pulse Characteristics (XA046)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 volt p-p	
300	Time Delay (XA046 FREQ) F05BSB2 & F05BSB0	304 ± 2 μsec	
317	REG SEL Indication	0000 000 000 000 000	
333	RG Indication	0000 000 000 000 111	
336	RG Indication	0000 000 000 000 111	
340	RG Indication	0000 000 000 000 111	
343	RG Indication	0000 000 000 111 000	
364	REG SEL Indication	0000 000 000 000 000	
377	RG Indication	0000 000 000 000 111	
380	RG Indication	0000 000 000 000 111	
384	RG Indication	0000 000 000 000 111	
387	RG Indication	0000 000 000 111 000	

DATE ____

JOB INPUT/OUTPUT REGISTERS TEST	**JDC** 05787 **REV.** A **PAGE** 1 **OF** 28 **INITIAL TDRR** 35464 **D.S. PGS** 12
SUBSYSTEM Computer	**ASSY.** Block II C-Computer

DESCRIPTION

Tests the operation of the computer input-output channels 5, 6, 12, 30, 31, 32, and 33. Procedures for checking input-output and continuous interface signals are also provided.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	3-22-68	35897	20, 23	7	EA JJ	-

REFERENCES JDC's 05401, 05405, 05413, 05414, ND-1021042, ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface panels are set-up as specified in JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the XY and RDC Interface panels of the CTS.

3. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

4. On the RDC Interface panel, set the CHV METERS switch to the DCVM position.

OPERATION

5. Press the LOAD CHAN V 2K OHMS and LOAD CHAN V 1K OHMS annunciators on the RDC Interface panel to energize.

6. Test signals RD086 and RD087 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 301.

b. Observe the digital voltmeter indication on the Power Control panel. Record on data sheet.

c. Press the LOAD CHAN V 2K OHMS annunciator to the off position.

7. Test signals RD166 and RD861 as follows:

---

a. Set the CHANNEL V switches to position 305.

b. Observe the digital voltmeter indication. Record on data sheet.

8. Test signals RD863 and RD869 as follows:

a. Set the CHANNEL V switches to position 306.

b. Observe the digital voltmeter indication. Record on data sheet.

9. Test signals RD865 and RD904 as follows:

a. Set the CHANNEL V switches to position 307.

b. Observe the digital voltmeter indication. Record on data sheet.

10. Test signals RD866 and RD867 as follows:

a. Set the CHANNEL V switches to 308.

b. Observe the digital voltmeter indication. Record on data sheet.

11. Test signals RD868 and RD870 as follows:

a. Press the LOAD CHAN V 1K OHMS annunciator to the off position, and press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 309.

c. Observe the digital voltmeter indication. Record on data sheet.

12. Test signals RD877 and RD878 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position, and press the LOAD CHAN V 1K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 313.

c. Observe the digital voltmeter indication. Record on data sheet.

13. Test signal RD091 as follows:

a. Press the LOAD CHAN V 1K OHMS annunciator to the off position, and press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 302.

c. Observe the digital voltmeter indication. Record on data sheet.

14. Test signal RD101 as follows:

a. Set the CHANNEL V switches to position 303.

b. Observe the digital voltmeter indication. Record on data sheet.

15. Test signal RD907 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position, and press the LOAD CHAN V 1K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 310.

c. Observe the digital voltmeter indication. Record on data sheet.

16. Test signal RD874 as follows:

a. Set the CHANNEL V switches to position 311.

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b. Observe the digital voltmeter indication. Record on data sheet.

17. Test signal RD876 as follows:

a. Press the LOAD CHAN V 1K OHMS annunciator to the off position and press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 312.

c. Observe the digital voltmeter indication. Record on data sheet.

18. Test signal RD879 as follows:

a. Set the CHANNEL V switches to position 314.

b. Observe the digital voltmeter indication. Record on data sheet.

19. Test signal RD251 as follows:

a. Set the CHANNEL V switches to position 319.

b. Observe the digital voltmeter indication (0 vdc). Record on data sheet.

20. Test signal RD903 as follows:

a. Set the CHANNEL V switches to position 401.

b. Observe the digital voltmeter indication. Record on data sheet.

21. Test signal RD175 as follows:

a. Set the CHANNEL V switches to position 402.

b. Observe the digital voltmeter indication (2 vdc). Record on data sheet.

22. Test signal RD176 as follows:

a. Set the CHANNEL V switches to position 403.

b. Observe the digital voltmeter indication (7.0 vdc). Record on data sheet.

23. Test signal RD177 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position and press the LOAD CHAN V 1K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 411.

c. Observe the digital voltmeter indication (2 vdc.) Record on data sheet.

24. Press LOAD CHAN V 1K OHMS to de-energize.

25. Set the CHANNEL V switches to position 101.

CHANNEL 5 CHECK

26. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00125.

27. Verify that the RZ display is 0000 000 000 000 101.

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28. Verify that the REG SEL display is 0000 000 001 010 101.

29. Press the CHANNEL button.

30. Press the EXECUTE button.

31. Verify that the LINC indicator is on.

32. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

33. Verify that the RZ display is 0000 000 000 000 101.

34. Press the CHANNEL button.

35. Press the EXECUTE button.

36. Verify that the OINC indicator is on.

37. Verify that the REG SEL display is 0000 000 001 010 101. Stamp data sheet.

38. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00252.

39. Verify that the RZ display is 0000 000 000 000 101.

40. Verify that the REG SEL display is 0000 000 010 101 010.

41. Press the CHANNEL button.

42. Press the EXECUTE button.

43. Verify that the LINC indicator is on.

44. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

45. Verify that the RZ display is 0000 000 000 000 101.

46. Press the CHANNEL button.

47. Press the EXECUTE button.

48. Verify that the OINC indicator is on.

49. Verify that the REG SEL display is 0000 000 010 101 010. Stamp data sheet.

50. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00000.

51. Verify that the RZ display is 0000 000 000 000 101.

52. Verify that the REG SEL display is 0000 000 000 000 000.

53. Press the CHANNEL button.

54. Press the EXECUTE button.

55. Verify that the LINC indicator is on.

56. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

57. Verify that the RZ display is 0000 000 000 000 101.

58. Press the CHANNEL button.

59. Press the EXECUTE button.

60. Verify that the OINC indicator is on.

61. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

62. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00377.

63. Verify that the RZ display is 0000 000 000 000 101.

64. Verify that the REG SEL display is 0000 000 011 111 111.

65. Press the CHANNEL button.

66. Press the EXECUTE button.

67. Verify that the LINC indicator is on.

68. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

69. Verify that the RZ display is 0000 000 000 000 101.

70. Press the CHANNEL button.

71. Press the EXECUTE button.

72. Verify that the OINC indicator is on.

73. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

74. Press FRESH START.

75. Press the READ-AGC pushbutton.

a. Press the CL Key.

b. Press Keys 0005.

76. Verify that the RZ display is 0000 000 000 000 101.

77. Press the CHANNEL button.

78. Press the EXECUTE button.

79. Verify that the OINC indicator is on.

80. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

DC OUTPUT TEST

81. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00377.

82. Verify that the RZ display is 0000 000 000 000 101.

83. Verify that the REG SEL display is 0000 000 011 111 111.

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84. Press the CHANNEL button.

85. Press the EXECUTE button.

86. Verify that the LINC indicator is on.

87. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

88. Verify that the RZ display is 0000 000 000 000 101.

89. Press the CHANNEL button.

90. Press the EXECUTE button.

91. Verify that the OINC indicator is on.

92. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

93. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

94. Set the CHV METERS switch on the RDC Interface panel to the DCVM position.

95. Depress the LOAD CHAN V 1K OHMS annunciator on the RDC Interface panel to energize.

96. Test signal CB801 as follows:

a. Set the CHANNEL V switch on the RDC Interface panel to position 601.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

97. Test signal CB806 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 602.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

98. Test signal CB805 as follows:

a. Set the CHANNEL V switches to position 603.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

99. Test signal CB802 as follows:

a. Set the CHANNEL V switches to position 604.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

100. Test signal CB803 as follows:

a. Set the CHANNEL V switches to position 605.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

101. Test signal CB808 as follows:

a. Set the CHANNEL V switches to position 606.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

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102. Test signal CB807 as follows:

a. Set the CHANNEL V switches to position 607.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

103. Test signal CB804 as follows:

a. Set the CHANNEL V switches to position 608.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

104. Set the CHV METERS switch to the OFF position.

105. Press LOAD CHAN V 1K OHMS to de-energize.

106. Set the CHANNEL V switches to position 101.

CHANNEL 6 CHECK

107. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00125.

108. Verify that the RZ display is 0000 000 000 000 110.

109. Verify that the REG SEL display is 0000 000 001 010 101.

110. Press the CHANNEL button.

111. Press the EXECUTE button.

112. Verify that the LINC indicator is on.

113. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

114. Verify that the RZ display is 0000 000 000 000 110.

115. Press the CHANNEL button.

116. Press the EXECUTE button.

117. Verify that the OINC indicator is on.

118. Verify that the REG SEL display is 0000 000 001 010 101. Stamp data sheet.

119. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00252.

120. Verify that the RZ display is 0000 000 000 000 110.

121. Verify that the REG SEL display is 0000 000 010 101 010.

122. Press the CHANNEL button.

123. Press the EXECUTE button.

124. Verify that the LINC indicator is on.

125. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

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b. Press Keys 0006.

126. Verify that the RZ display is 0000 000 000 000 110.

127. Press the CHANNEL button.

128. Press the EXECUTE button.

129. Verify that the OINC indicator is on.

130. Verify that the REG SEL display is 0000 000 010 101 010. Stamp data sheet.

131. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00000.

132. Verify that the RZ display is 0000 000 000 000 110.

133. Verify that the REG SEL display is 0000 000 000 000 000.

134. Press the CHANNEL button.

135. Press the EXECUTE button.

136. Verify that the LINC indicator is on.

137. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

138. Verify that the RZ display is 0000 000 000 000 110.

139. Press the CHANNEL button.

140. Press the EXECUTE button.

141. Verify that the OINC indicator is on.

142. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

143. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00377.

144. Verify that the RZ display is 0000 000 000 000 110.

145. Verify that the REG SEL display is 0000 000 011 111 111.

146. Press the CHANNEL button.

147. Press the EXECUTE button.

148. Verify that the LINC indicator is on.

149. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

150. Verify that the RZ display is 0000 000 000 000 110.

151. Press the CHANNEL button.

152. Press the EXECUTE button.

153. Verify that the OINC indicator is on.

154. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

155. Press FRESH START.

156. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

157. Verify that the RZ display is 0000 000 000 000 110.

158. Press the CHANNEL button.

159. Press the EXECUTE button.

160. Verify that the OINC indicator is on.

161. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

DC OUTPUT TEST

162. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00377.

163. Verify that the RZ display is 0000 000 000 000 110.

164. Verify that the REG SEL display is 0000 000 011 111 111.

165. Press the CHANNEL button.

166. Press the EXECUTE button.

167. Verify that the LINC indicator is on.

168. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

169. Verify that the RZ display is 0000 000 000 000 110.

170. Press the CHANNEL button.

171. Press the EXECUTE button.

172. Verify that the OINC indicator is on.

173. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

174. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

175. Set the CHV METERS switch on the RDC Interface panel to the DCVM position.

176. Press the LOAD CHAN V 1K OHMS annunciator on the RDC Interface panel to energize.

177. Test signal CB813 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 609.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

178. Test signal CB816 as follows:

a. Set the CHANNEL V switches to position 610.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

179. Test signal CB815 as follows:

a. Set the CHANNEL V switches to position 611.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

180. Test signal CB814 as follows:

a. Set the CHANNEL V switches to position 612.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

181. Test signal CB809 as follows:

a. Set the CHANNEL V switches to position 613.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

182. Test signal CB812 as follows:

a. Set the CHANNEL V switches to position 614.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

183. Test signal CB811 as follows:

a. Set the CHANNEL V switches to position 615.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

184. Test signal CB810 as follows:

a. Set the CHANNEL V switches to position 616.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

185. Set the CHV METERS switch to the OFF position.

186. Press LOAD CHAN V 1K OHMS to de-energize.

187. Set the CHANNEL V switches to position 101.

188. Press the KEYBOARD LOAD pushbutton indicator.

189. Press the CL Key.

190. Press Keys 00012.

191. Press Keys 52525.

192. Verify that the RZ display is 0000 000 000 001 010.

193. Verify that the REG SEL display is 0101 010 101 010 101.

194. Press the CHANNEL button.

195. Press the EXECUTE button.

196. Verify that the LINC indicator is on.

197. Press the READ-AGC pushbutton indicator.

198. Press the CL Key.

199. Press Keys 0012.

200. Verify that the RZ display is 0000 000 000 001 010.

201. Press the CHANNEL button.

202. Press the EXECUTE button.

203. Verify that the OINC indicator is on.

204. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

205. Press the KEYBOARD LOAD pushbutton indicator.

206. Press the CL Key.

207. Press Keys 00012.

208. Press Keys 25252.

209. Verify that the RZ display is 0000 000 000 001 010.

210. Verify that the REG SEL display is 0010 101 010 101 010.

211. Press the CHANNEL button.

212. Press the EXECUTE button.

213. Verify that the LINC indicator is on.

214. Press the READ-AGC pushbutton indicator.

215. Press the CL Key.

216. Press Keys 0012.

217. Verify that the RZ display is 0000 000 000 001 010.

218. Press the CHANNEL button.

219. Press the EXECUTE button.

220. Verify that the OINC indicator is on.

221. Verify that the REG SEL display is 0010 101 010 101 010. Stamp data sheet.

222. Press the KEYBOARD LOAD pushbutton indicator.

223. Press the CL Key.

224. Press Keys 00012.

225. Press Keys 00000.

226. Verify that the RZ display is 0000 000 000 001 010.

227. Verify that the REG SEL display is 0000 000 000 000 000.

228. Press the CHANNEL button.

229. Press the EXECUTE button.

230. Verify that the LINC indicator is on.

231. Press the READ-AGC pushbutton indicator.

232. Press the CL Key.

233. Press Keys 0012.

234. Verify that the RZ display is 0000 000 000 001 010.

235. Press the CHANNEL button.

236. Press the EXECUTE button.

237. Verify that the OINC indicator is on.

238. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

239. Press the KEYBOARD LOAD pushbutton indicator.

240. Press the CL Key.

241. Press Keys 00012.

242. Press Keys 77777.

243. Verify that the RZ display is 0000 000 000 001 010.

244. Verify that the REG SEL display is 0111 111 111 111 111.

245. Press the CHANNEL button.

246. Press the EXECUTE button.

247. Verify that the LINC indicator is on.

248. Press the READ-AGC pushbutton indicator.

249. Press the CL Key.

250. Press Keys 0012.

251. Verify that the RZ display is 0000 000 000 001 010.

252. Press the CHANNEL button.

253. Press the EXECUTE button.

254. Verify that the OINC indicator is on.

255. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

256. Press FRESH START.

257. Press the CL Key.

258. Press Keys 0012.

259. Verify that the RZ display is 0000 000 000 001 010.

260. Press the CHANNEL button.

261. Press the EXECUTE button.

262. Verify that the OINC indicator is on.

263. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

264. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

265. On the RDC Interface panel:

a. Set the CHV METERS switch to the DCVM position.

b. Depress the LOAD CHAN V 1K OHMS annunciator to energize.

266. Depress the LOAD CHAN V 2K OHMS annunciator to energize.

267. Test signal CB013 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 520.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

268. Press the KEYBOARD LOAD pushbutton indicator.

269. Press the CL Key.

270. Press Keys 00012.

271. Press Keys 77777.

272. Verify that the RZ display is 0000 000 000 001 010.

273. Verify that the REG SEL display is 0111 111 111 111 111.

274. Press the CHANNEL button.

275. Press the EXECUTE button.

276. Verify that the LINC indicator is on.

277. Verify that the M34 indicator (CB233) on the XY Interface panel is on. Stamp data sheet.

278. Verify that the M36 indicator (CB234) on the XY Interface panel is on. Stamp data sheet.

279. Test signal CB909 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position.

b. Set the CHANNEL V switches to position 405.

c. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

280. Test signal CB160 as follows:

a. Set the CHANNEL V switches to position 406.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

281. Test signal CB906 as follows:

a. Set the CHANNEL V switch to position 501.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

282. Test signal CB185 as follows:

a. Set the CHANNEL V switches to position 502.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

283. Test signal CB186 as follows:

a. Set the CHANNEL V switches to position 503.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

284. Test signal CB902 as follows:

a. Set the CHANNEL V switches to position 504.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

285. Test signal CB162. as follows:

a. Set the CHANNEL V switches to position 505.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

286. Test signal CB011 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 506.

c. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

287. Test signal CB161 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position.

b. Set the CHANNEL V switches to position 507.

c. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

288. Test signal CB194 as follows:

a. Set the CHANNEL V switches to position 508.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

289. Test signal CB195 as follows:

a. Set the CHANNEL V switches to position 509.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

290. Test signal CB196 as follows:

a. Set the CHANNEL V switches to position 510.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

291. Test signal CB841 as follows:

a. Set the CHANNEL V switches to position 617.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

292. Set the CHV METERS switch to the OFF position.

293. Press LOAD CHAN V 1K OHMS to de-energize.

CHANNEL 30 CHECK

294. Press the READ-AGC indicator switch to the on (illuminated) position.

295. Press Keys CL, 0030.

296. Verify that the RZ display is 0000 000 000 011 000.

297. Press the CHANNEL button.

298. Press the EXECUTE button.

299. Verify that the OINC indicator is on.

300. Press the FORCED READ indicator switch to the on (illuminated) position.

301. Set the T12 COUNTER STOP switch to the OFF position.

302. Press the PROCEED button.

303. Verify that the OINC indicator is on.

304. Verify that the STPIT indicator is off.

NOTE: The annunciators
listed in this procedure are
indicator switches, which
are alternately depressed
to energize (illuminated)
and alternately depressed
to de-energize (extinguished).

305. Energize the following annunciators:

- a. CH30-14/IN0-14
- b. CH30-12/IN0-12
- c. CH30-10/IN0-10
- d. CH30-8/IN0-8
- e. CH30-6/IN0-6
- f. CH30-4/IN0-4
- g. CH30-2/IN0-2

306. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

307. Energize the following annunciators:

- a. CH30-15/IN0-15
- b. CH30-13/IN0-13
- c. CH30-11/IN0-11
- d. CH30-9/IN0-9
- e. CH30-7/IN0-7
- f. CH30-5/IN0-5
- g. CH30-3/IN0-3
- h. CH30-1/IN0-1

308. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

309. De-energize the following annunciators:

- a. CH30-14/IN0-14
- b. CH30-12/IN0-12
- c. CH30-10/IN0-10
- d. CH30-8/IN0-8
- e. CH30-6/IN0-6
- f. CH30-4/IN0-4
- g. CH30-2/IN0-2

310. Verify that the REG SEL display is 0010 101 010 101 010. Stamp data sheet.

311. De-energize the following annunciators:

- a. CH30-15/IN0-15
- b. CH30-13/IN0-13
- c. CH30-11/IN0-11
- d. CH30-9/IN0-9
- e. CH30-7/IN0-7
- f. CH30-5/IN0-5
- g. CH30-3/IN0-3
- h. CH30-1/IN0-1

312. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

High Zero Test

313. Set the DE MARGINS switch to the V0 position.

314. Energize the CH30-15/IN0-15 through CH30-1/IN0-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

315. De-energize the CH30-15/IN0-15 through CH30-1/IN0-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

316. Set the DE MARGINS switch to the V1 position.

317. Energize the CH30-15/IN0-15 annunciator.

318. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

319. De-energize the CH30-15/IN0-15 annunciator.

320. Energize the CH30-14/IN0-14 annunciator.

321. Verify that the REG SEL display is 1101 111 111 111 111. Stamp data sheet.

322. De-energize the CH30-14/IN0-14 annunciator.

323. Energize the CH30-13/IN0-13 annunciator.

324. Verify that the REG SEL display is 1110 111 111 111 111. Stamp data sheet.

325. De-energize the CH30-13/IN0-13 annunciator.

326. Energize the CH30-12/IN0-12 annunciator.

327. Verify that the REG SEL display is 1111 011 111 111 111. Stamp data sheet.

328. De-energize the CH30-12/IN0-12 annunciator.

329. Energize the CH30-11/IN0-11 annunciator.

330. Verify that the REG SEL display is 1111 101 111 111 111. Stamp data sheet.

331. De-energize the CH30-11/IN0-11 annunciator.

332. Energize the CH30-10/IN0-10 annunciator.

333. Verify that the REG SEL display is 1111 110 111 111 111. Stamp data sheet.

334. De-energize the CH30-10/IN0-10 annunciator.

335. Energize the CH30-9/IN0-9 annunciator.

336. Verify that the REG SEL display is 1111 111 011 111 111. Stamp data sheet.

337. De-energize the CH30-9/IN0-9 annunciator.

338. Energize the CH30-8/IN0-8 annunciator.

339. Verify that the REG SEL display is 1111 111 101 111 111. Stamp data sheet.

340. De-energize the CH30-8/IN0-8 annunciator.

341. Energize the CH30-7/IN0-7 annunciator.

342. Verify that the REG SEL display is 1111 111 110 111 111. Stamp data sheet.

343. De-energize the CH30-7/IN0-7 annunciator.

344. Energize the CH30-6/IN0-6 annunciator.

345. Verify that the REG SEL display is 1111 111 111 011 111. Stamp data sheet.

346. De-energize the CH30-6/IN0-6 annunciator.

347. Energize the CH30-5/IN0-5 annunciator.

348. Verify that the REG SEL display is 1111 111 111 101 111. Stamp data sheet.

349. De-energize the CH-5/IN0-5 annunciator.

350. Energize the CH30-4/IN0-4 annunciator.

351. Verify that the REG SEL display is 1111 111 111 110 111. Stamp data sheet.

352. De-energize the CH30-4/IN0-4 annunciator.

353. Energize the CH30-3/IN0-3 annunciator.

354. Verify that the REG SEL display is 1111 111 111 111 011. Stamp data sheet.

355. De-energize the CH30-3/IN0-3 annunciator.

356. Energize the CH30-2/IN0-2 annunciator.

357. Verify that the REG SEL display is 1111 111 111 111 101. Stamp data sheet.

358. De-energize the CH30-2/IN0-2 annunciator.

359. Energize the CH30-1/IN0-1 annunciator.

360. Verify that the REG SEL display is 1111 111 111 111 110. Stamp data sheet.

361. De-energize the CH30-1/IN0-1 annunciator.

Delete

362. Set the DE MARGINS switch to the NORM position.

363. Set the T12 COUNTER STOP switch to the ON position.

364. De-energize the FORCED READ annunciator.

CHANNEL 31 CHECK

365. Press Keys CL, 0031.

366. Verify that the RZ display is 0000 000 000 011 001.

367. Press the CHANNEL button.

368. Press the EXECUTE button.

369. Verify that the OINC indicator is on.

370. Press the FORCED READ indicator switch to the on (illuminated) position.

371. Set the T12 COUNTER STOP switch to the OFF position.

372. Press the PROCEED button.

373. Verify that the OINC indicator is on.

374. Verify that the STPIT indicator is off.

375. Energize the following annunciators:

   a. CH31-14/IN2-14
   b. CH31-12/IN2-12
   c. CH31-10/IN2-10
   d. CH31-8/IN2-8
   e. CH31-6/IN2-6
   f. CH31-4/IN2-4

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   g. CH31-2/IN2-2

376. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

377. Energize the following annunciators:

   a. CH31-15/IN2-15
   b. CH31-13/IN2-13
   c. CH31-11/IN2-11
   d. CH31-9/IN2-9
   e. CH31-7/IN2-7
   f. CH31-5/IN2-5
   g. CH31-3/IN2-3
   h. CH31-1/IN2-1

378. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

379. De-energize the following annunciators:

   a. CH31-14/IN2-14
   b. CH31-12/IN2-12
   c. CH31-10/IN2-10
   d. CH31-8/IN2-8
   e. CH31-6/IN2-6
   f. CH31-4/IN2-4
   g. CH31-2/IN2-2

380. Verify that the REG SEL display is 0010 101 010 101 010. Stamp data sheet.

381. De-energize the following annunciators:

   a. CH31-15/IN2-15
   b. CH31-13/IN2-13
   c. CH31-11/IN2-11
   d. CH31-9/IN2-9
   e. CH31-7/IN2-7
   f. CH31-5/IN2-5
   g. CH31-3/IN2-3
   h. CH31-1/IN2-1

382. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

High Zero Test

383. Set the DE MARGINS switch to the V0 position.

384. Energize the CH31-15/IN2-15 through CH31-1/IN2-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

385. De-energize the CH31-15/IN2-15 through CH31-1/IN2-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

386. Set the DE MARGINS switch to the V1 position.

387. Energize the CH31-15/IN2-15 annunciator.

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388. Verify that the REG SEL display is 0011 111 111 111 111. Stamp data sheet.

389. De-energize the CH31-15/IN2-15 annunciator.

390. Energize the CH31-14/IN2-14 annunciator.

391. Verify that the REG SEL display is 1101 111 111 111 111. Stamp data sheet.

392. De-energize the CH31-14/IN2-14 annunciator.

393. Energize the CH31-13/IN2-13 annunciator.

394. Verify that the REG SEL display is 1110 111 111 111 111. Stamp data sheet.

395. De-energize the CH31-13/IN2-13 annunciator.

396. Energize the CH31-12/IN2-12 annunciator.

397. Verify that the REG SEL display is 1111 011 111 111 111. Stamp data sheet.

398. De-energize the CH31-12/IN2-12 annunciator.

399. Energize the CH31-11/IN2-11 annunciator.

400. Verify that the REG SEL display is 1111 101 111 111 111. Stamp data sheet.

401. De-energize the CH31-11/IN2-11 annunciator.

402. Energize the CH31-10/IN2-10 annunciator.

403. Verify that the REG SEL display is 1111 110 111 111 111. Stamp data sheet.

404. De-energize the CH31-10/IN2-10 annunciator.

405. Energize the CH31-9/IN2-9 annunciator.

406. Verify that the REG SEL display is 1111 111 011 111 111. Stamp data sheet.

407. De-energize the CH31-9/IN2-9 annunciator.

408. Energize the CH31-8/IN2-8 annunciator.

409. Verify that the REG SEL display is 1111 111 101 111 111. Stamp data sheet.

410. De-energize the CH31-8/IN2-8 annunciator.

411. Energize the CH31-7/IN2-7 annunciator.

412. Verify that the REG SEL display is 1111 111 110 111 111. Stamp data sheet.

413. De-energize the CH31-7/IN2-7 annunciator.

414. Energize the CH31-6/IN2-6 annunciator.

415. Verify that the REG SEL display is 1111 111 111 011 111. Stamp data sheet.

416. De-energize the CH31-6/IN2-6 annunciator.

417. Energize the CH31-5/IN2-5 annunciator.

418. Verify that the REG SEL display is 1111 111 111 101 111. Stamp data sheet.

419. De-energize the CH31-5/IN2-5 annunciator.

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420. Energize the CH31-4/IN2-4 annunciator.

421. Verify that the REG SEL display is 1111 111 111 110 111. Stamp data sheet.

422. De-energize the CH31-4/IN2-4 annunciator.

423. Energize the CH31-3/IN2-3 annunciator.

424. Verify that the REG SEL display is 1111 111 111 111 011. Stamp data sheet.

425. De-energize the CH31-3/IN2-3 annunciator.

426. Energize the CH31-2/IN2-2 annunciator.

427. Verify that the REG SEL display is 1111 111 111 111 101. Stamp data sheet.

428. De-energize the CH31-2/IN2-2 annunciator.

429. Energize the CH31-1/IN2-1 annunciator.

430. Verify that the REG SEL display is 1111 111 111 111 110. Stamp data sheet.

431. De-energize the CH31-1/IN2-1 annunciator.

432. Set the DE MARGINS switch to the NORM position.

433. Set the T12 COUNTER STOP switch to the ON position.

434. De-energize the FORCED READ annunciator.

CHANNEL 32 CHECK

> NOTE: If ECP 518 has been incorporated, CH32-14/IN3-14 will be functional as detailed in the steps specifying the state of the REG SEL display.

435. Press Keys CL, 0032.

436. Verify that the RZ display is 0000 000 000 011 010.

437. Press the CHANNEL button.

438. Press the EXECUTE button.

439. Verify that the OINC indicator is on.

440. Press the FORCED READ indicator switch to the on (illuminated) position.

441. Set the T12 COUNTER STOP switch to the OFF position.

442. Press the PROCEED button.

443. Verify that the OINC indicator is on.

444. Verify that the STPIT indicator is off.

445. Energize the following annunciators:

   a. CH32-14/IN3-14
   b. CH32-12/IN3-12
   c. CH32-10/IN3-10
   d. CH32-8/IN3-8
   e. CH32-6/IN3-6
   f. CH32-4/IN3-4

g. CH32-2/IN3-2

446. Verify that the REG SEL display is 1101 110 101 010 101. (Without ECP 518, 1111 110 101 010 101). Stamp data sheet.

447. Energize the following annunciators:

a. CH32-15/IN3-15

b. CH32-13/IN3-13

c. CH32-11/IN3-11

d. CH32-9/IN3-9

e. CH32-7/IN3-7

f. CH32-5/IN3-5

g. CH32-3/IN3-3

h. CH32-1/IN3-1

448. Verify that the REG SEL display is 1101 100 000 000 000. (Without ECP 518, 1111 100 000 000 000). Stamp data sheet.

449. De-energize the following annunciators:

a. CH32-14/IN3-14

b. CH32-12/IN3-12

c. CH32-10/IN3-10

d. CH32-8/IN3-8

e. CH32-6/IN3-6

f. CH32-4/IN3-4

g. CH32-2/IN3-2

450. Verify that the REG SEL display is 1111 101 010 101 010. Stamp data sheet.

451. De-energize the following annunciators:

a. CH32-15/IN3-15

b. CH32-13/IN3-13

c. CH32-11/IN3-11

d. CH32-9/IN3-9

e. CH32-7/IN3-7

f. CH32-5/IN3-5

g. CH32-3/IN3-3

h. CH32-1/IN3-1

452. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

High Zero Test

453. Set the DE MARGINS switch to the V0 position.

454. Energize the CH32-15/IN3-15 through CH32-1/IN3-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

455. De-energize the CH32-15/IN3-15 through CH32-1/IN3-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

456. Set the DE MARGINS switch to the V1 position.

---

457. Energize the CH32-15/IN3-15 annunciator.

458. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

459. De-energize the CH32-15/IN3-15 annunciator.

460. Energize the CH32-14/IN3-14 annunciator.

461. Verify that the REG SEL display is 1101 111 111 111 111. (Without ECP 518, 1111 111 111 111 111). Stamp data sheet.

462. De-energize the CH32-14/IN3-14 annunciator.

463. Energize the CH32-13/IN3-13 annunciator.

464. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

465. De-energize the CH32-13/IN3-13 annunciator.

466. Energize the CH32-12/IN3-12 annunciator.

467. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

468. De-energize the CH32-12/IN3-12 annunciator.

469. Energize the CH32-11/IN3-11 annunciator.

470. Verify that the REG SEL display is 1111 101 111 111 111. Stamp data sheet.

471. De-energize the CH32-11/IN3-11 annunciator.

472. Energize the CH32-10/IN3-10 annunciator.

473. Verify that the REG SEL display is 1111 110 111 111 111. Stamp data sheet.

474. De-energize the CH32-10/IN3-10 annunciator.

475. Energize the CH32-9/IN3-9 annunciator.

476. Verify that the REG SEL display is 1111 111 011 111 111. Stamp data sheet.

477. De-energize the CH32-9/IN3-9 annunciator.

478. Energize the CH32-8/IN3-8 annunciator.

479. Verify that the REG SEL display is 1111 111 101 111 111. Stamp data sheet.

480. De-energize the CH32-8/IN3-8 annunciator.

481. Energize the CH32-7/IN3-7 annunciator.

482. Verify that the REG SEL display is 1111 111 110 111 111. Stamp data sheet.

483. De-energize the CH32-7/IN3-7 annunciator.

484. Energize the CH32-6/IN3-6 annunciator.

485. Verify that the REG SEL display is 1111 111 111 011 111. Stamp data sheet.

486. De-energize the CH32-6/IN3-6 annunciator.

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487. Energize the CH32-5/IN3-5 annunciator.

488. Verify that the REG SEL display is 1111 111 111 101 111. Stamp data sheet.

489. De-energize the CH32-5/IN3-5 annunciator.

490. Energize the CH32-4/IN3-4 annunciator.

491. Verify that the REG SEL display is 1111 111 111 110 111. Stamp data sheet.

492. De-energize the CH32-4/IN3-4 annunciator.

493. Energize the CH32-3/IN3-3 annunciator.

494. Verify that the REG SEL display is 1111 111 111 111 011. Stamp data sheet.

495. De-energize the CH32-3/IN3-3 annunciator.

496. Energize the CH32-2/IN3-2 annunciator.

497. Verify that the REG SEL display is 1111 111 111 111 101. Stamp data sheet.

498. De-energize the CH32-2/IN3-2 annunciator.

499. Energize the CH32-1/IN3-1 annunciator.

500. Verify that the REG SEL display is 1111 111 111 111 110. Stamp data sheet. De-energize the CH32-1/IN3-1 annunciator and set the DE MARGINS switch to the NORMAL position.

> NOTE: If ECP 518 has not been incorporated, do not perform steps 501 and 502.

501. Depress the DSKY PRO (STBY) pushbutton, and hold depressed just long enough to verify that bit 14 of the REG SEL display is a zero (1101 111 111 111 111). Stamp data sheet.

502. Verify that bit 14 of the REG SEL display switched back to a one (1111 111 111 111 111) when the DSKY PRO (STBY) pushbutton was released. Stamp data sheet.

503. Set the T12 COUNTER STOP switch to the ON position.

504. De-energize the FORCED READ annunciator.

CHANNEL 33 CHECK

505. Press Keys CL, 0033.

506. Verify that the RZ display is 0000 000 000 011 011.

507. Press the CHANNEL button.

508. Press the EXECUTE button.

509. Verify that the OINC indicator is on.

510. Press the FORCED READ indicator switch to the on (illuminated) position.

511. Set the T12 COUNTER STOP switch to the OFF position.

512. Press the PROCEED button.

513. Verify that the OINC indicator is on.

514. Verify that the STPIT indicator is off.

515. Energize the following annunciators:

a. CH33-10

b. CH33-8

c. CH33-6

d. CH33-4

e. CH33-2

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516. Verify that the REG SEL display is 1100 110 101 010 101. Stamp data sheet.

517. Energize the following annunciators:

a. CH33-9

b. CH33-7

c. CH33-5

d. CH33-3

e. CH33-1

518. Verify that the REG SEL display is 1100 110 000 000 000. Stamp data sheet.

519. De-energize the following annunciators:

a. CH33-10

b. CH33-8

c. CH33-6

d. CH33-4

e. CH33-2

520. Verify that the REG SEL display is 1100 111 010 101 010. Stamp data sheet.

521. De-energize the following annunciators:

a. CH33-9

b. CH33-7

c. CH33-5

d. CH33-3

e. CH33-1

522. Verify that the REG SEL display is 1100 111 111 111 111. Stamp data sheet.

High Zero Test

523. Set the DE MARGINS switch to the V0 position.

524. Energize the CH33-10 through CH33-1 annunciators and verify that the REG SEL display remains 1100 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

525. De-energize the CH33-10 through CH33-1 annunciators and verify that the REG SEL display remains 1100 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

526. Set the DE MARGINS switch to the V1 position.

527. Energize the CH33-10 annunciator.

528. Verify that the REG SEL display is 1100 110 111 111 111. Stamp data sheet.

529. De-energize the CH33-10 annunciator.

530. Energize the CH33-9 annunciator.

531. Verify that the REG SEL display is 1100 111 011 111 111. Stamp data sheet.

532. De-energize the CH33-9 annunciator.

533. Energize the CH33-8 annunciator.

534. Verify that the REG SEL display is 1100 111 101 111 111. Stamp data sheet.

535. De-energize the CH33-8 annunciator.

536. Energize the CH33-7 annunciator.

537. Verify that the REG SEL display is 1100 111 110 111 111. Stamp data sheet.

538. De-energize the CH33-7 annunciator.

539. Energize the CH33-6 annunciator.

540. Verify that the REG SEL display is 1100 111 111 011 111. Stamp data sheet.

541. De-energize the CH33-6 annunciator.

542. Energize the CH33-5 annunciator.

543. Verify that the REG SEL display is 1100 111 111 101 111. Stamp data sheet.

544. De-energize the CH33-5 annunciator.

545. Energize the CH33-4 annunciator.

546. Verify that the REG SEL display is 1100 111 111 110 111. Stamp data sheet.

547. De-energize the CH33-4 annunciator.

548. Energize the CH33-3 annunciator.

549. Verify that the REG SEL display is 1100 111 111 111 011. Stamp data sheet.

550. De-energize the CH33-3 annunciator.

551. Energize the CH33-2 annunciator.

552. Verify that the REG SEL display is 1100 111 111 111 101. Stamp data sheet.

553. De-energize the CH33-2 annunciator.

554. Energize the CH33-1 annunciator.

555. Verify that the REG SEL display is 1100 111 111 111 110. Stamp data sheet.

556. De-energize the CH33-1 annunciator.

557. Set the DE MARGINS switch to the NORM position.

558. Set the T12 COUNTER STOP switch to the ON position.

559. De-energize the FORCED READ annunciator.

CONTINUOUS SIGNALS CHECK

560. Perform the preparation section of Frequency Measurement, JDC 05401.

561. Perform the preparation section of Pulse Measurement, JDC 05405.

562. On the XY Interface panel:

a. Set the SCOPE switch to the DIFF S position.

b. Press LOAD CHAN S 510 OHMS to energize.

563. Test signal XC 191 as follows:

a. Set the CHANNEL S switches to the 104 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

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c. Measure the frequency (51,200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

564. Test signal XC048 as follows:

a. Set the CHANNEL S switches to the 105 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the Frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

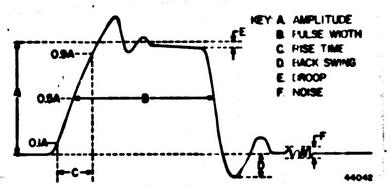

Figure 1

565. Test signal XC139 as follows:

a. Set the CHANNEL S switches to the 107 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

566. Test signal XC140 as follows:

a. Set the CHANNEL S switches to the 108 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

567. Test signal XC197 as follows:

a. Set the CHANNEL S switches to the 109 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

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e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

568. Test signal XC149 as follows:

a. Set the CHANNEL S switches on the XY Interface panel to the 110 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (800 cps) displayed on Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

569. Test signal XC150 as follows:

a. Set the CHANNEL S switches to the 111 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (800 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

570. Test signal XC151 as follows:

a. Set the CHANNEL S switches to the 112 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

571. Test signal XC152 as follows:

a. Set the CHANNEL S switches to the 113 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

572. Test signal XC155 as follows:

a. Set the CHANNEL S switches to the 116 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (12.8 kpps) displayed on the Frequency Counter. Record on data sheet.

---

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

573. Test signal XC901 as follows:

a. Set the CHANNEL S switches to the 117 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (25.6 kpps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

574. Test signal XC052 as follows:

a. Set the CHANNEL S switches to the 118 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 12

JDC
NO. 05787
REV. A
INITIAL TDRR 35464

JOB INPUT/OUTPUT REGISTERS TEST

ASSEMBLY UNDER TEST
TITLE
SER. NO. DWG REV.

TEST HISTORY
DATE START END SITE / LOCATION
TIME START END TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME SER. NO. CAL DATE
NAME SER. NO. CAL DATE

CONDUCTED BY NAME/AFFILIATION APPROVED BY NAME/AFFILIATION

Step	Parameter	Specification	Results
6.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
7.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
8.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
9.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
10.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
11.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
12.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
13.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
14.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
15.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
16.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
17.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
18.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
19.	Digital Voltmeter Indication	0.0 (± 1.0) vdc	
20.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	

DATE 18 JAN 68

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 12

JDC
NO. 05787
REV. A

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
21.	Digital Voltmeter Indication	2.0 (± 0.6) vdc	
22.	Digital Voltmeter Indication	7.0 (± 0.25) vdc	
23.	Digital Voltmeter Indication	2.0 (± 0.6) vdc	
37.	REG SEL Indication	0000 000 001 010 101	
49.	REG SEL Indication	0000 000 010 101 010	
61.	REG SEL Indication	0000 000 000 000 000	
73.	REG SEL Indication	0000 000 011 111 111	
80.	REG SEL Indication	0000 000 000 000 000	
92.	REG SEL Indication	0000 000 011 111 111	
96.	Digital Voltmeter Indication	2.5 vdc	
97.	Digital Voltmeter Indication	2.5 vdc	
98.	Digital Voltmeter Indication	2.5 vdc	
99.	Digital Voltmeter Indication	2.5 vdc	
100.	Digital Voltmeter Indication	2.5 vdc	
101.	Digital Voltmeter Indication	2.5 vdc	
102.	Digital Voltmeter Indication	2.5 vdc	
103.	Digital Voltmeter Indication	2.5 vdc	
118.	REG SEL Indication	0000 000 001 010 101	
130.	REG SEL Indication	0000 000 010 101 010	
142.	REG SEL Indication	0000 000 000 000 000	
154.	REG SEL Indication	0000 000 011 111 111	
161.	REG SEL Indication	0000 000 000 000 000	

DATE 18 JAN 68

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 12

JDC
NO. 05787
REV. A

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
173.	REG SEL Indication	0000 000 011 111 111	
177.	Digital Voltmeter Indication	2.5 vdc	
178.	Digital Voltmeter Indication	2.5 vdc	
179.	Digital Voltmeter Indication	2.5 vdc	
180.	Digital Voltmeter Indication	2.5 vdc	
181.	Digital Voltmeter Indication	2.5 vdc	
182.	Digital Voltmeter Indication	2.5 vdc	
183.	Digital Voltmeter Indication	2.5 vdc	
184.	Digital Voltmeter Indication	2.5 vdc	
204.	REG SEL Indication	1101 010 101 010 101	
221.	REG SEL Indication	0010 101 010 101 010	
238.	REG SEL Indication	0000 000 000 000 000	
255.	REG SEL Indication	1111 111 111 111 111	
263.	REG SEL Indication	0000 000 000 000 000	
267.	Digital Voltmeter Indication	2.5 vdc	
277.	Illuminated XY Indicator	M34	
278.	Illuminated XY Indicator	M36	
279c.	Digital Voltmeter Indication	2.5 vdc	
280b.	Digital Voltmeter Indication	2.5 vdc	
281b.	Digital Voltmeter Indication	2.5 vdc	
282b.	Digital Voltmeter Indication	2.5 vdc	
283b.	Digital Voltmeter Indication	2.5 vdc	

DATE 18 JAN 68

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 12

JDC
NO. 05787
REV. A

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
284b.	Digital Voltmeter Indication	2.5 vdc	
285b.	Digital Voltmeter Indication	2.5 vdc	
286c.	Digital Voltmeter Indication	2.5 vdc	
287c.	Digital Voltmeter Indication	2.5 vdc	
288b.	Digital Voltmeter Indication	2.5 vdc	
289b.	Digital Voltmeter Indication	2.5 vdc	
290b.	Digital Voltmeter Indication	2.5 vdc	
291b.	Digital Voltmeter Indication	2.5 vdc	
306.	REG SEL Indication	1101 010 101 010 101	
308.	REG SEL Indication	0000 000 000 000 000	
310.	REG SEL Indication	0010 101 010 101 010	
312.	REG SEL Indication	1111 111 111 111 111	
314.	REG SEL Indication	1111 111 111 111 111	
315.	REG SEL Indication	1111 111 111 111 111	
318.	REG SEL Indication	0000 000 000 000 000	
321.	REG SEL Indication	1101 111 111 111 111	
324.	REG SEL Indication	1110 111 111 111 111	
327.	REG SEL Indication	1111 011 111 111 111	
330.	REG SEL Indication	1111 101 111 111 111	
333.	REG SEL Indication	1111 110 111 111 111	
336.	REG SEL Indication	1111 111 011 111 111	
339.	REG SEL Indication	1111 111 101 111 111	

DATE 18 JAN 68

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 12

JDC
NO. 05787
REV. A

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
342.	REG SEL Indication	1111 111 110 111 111	
345.	REG SEL Indication	1111 111 111 011 111	
348.	REG SEL Indication	1111 111 111 101 111	
351.	REG SEL Indication	1111 111 111 110 111	
354.	REG SEL Indication	1111 111 111 111 011	
357.	REG SEL Indication	1111 111 111 111 101	
360.	REG SEL Indication	1111 111 111 111 110	
376.	REG SEL Indication	1101 010 101 010 101	
378.	REG SEL Indication	0000 000 000 000 000	
380.	REG SEL Indication	0010 101 010 101 010	
382.	REG SEL Indication	1111 111 111 111 111	
384.	REG SEL Indication	1111 111 111 111 111	
385.	REG SEL Indication	1111 111 111 111 111	
388.	REG SEL Indication	0011 111 111 111 111	
391.	REG SEL Indication	1101 111 111 111 111	
394.	REG SEL Indication	1110 111 111 111 111	
397.	REG SEL Indication	1111 011 111 111 111	
400.	REG SEL Indication	1111 101 111 111 111	
403.	REG SEL Indication	1111 110 111 111 111	
406.	REG SEL Indication	1111 111 011 111 111	
409.	REG SEL Indication	1111 111 101 111 111	
412.	REG SEL Indication	1111 111 110 111 111	

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DATA SHEET 6 OF 12

JDC
NO. 05787
REV. A

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
415.	REG SEL Indication	1111 111 111 011 111	
418.	REG SEL Indication	1111 111 111 101 111	
421.	REG SEL Indication	1111 111 111 110 111	
424.	REG SEL Indication	1111 111 111 111 011	
427.	REG SEL Indication	1111 111 111 111 101	
430.	REG SEL Indication	1111 111 111 111 110	
446.	REG SEL Indication	1111 110 101 010 101 (ECP 518, 1101 110 101 010 101	
448.	REG SEL Indication	1111 100 000 000 000 (ECP 518, 1101 100 000 000 000	
450.	REG SEL Indication	1111 101 010 101 010	
452.	REG SEL Indication	1111 111 111 111 111	
454.	REG SEL Indication	1111 111 111 111 111	
455.	REG SEL Indication	1111 111 111 111 111	
458.	REG SEL Indication	1111 111 111 111 111	
461.	REG SEL Indication	1111 111 111 111 111 (ECP 518, 1101 111 111 111 111	
464.	REG SEL Indication	1111 111 111 111 111	
467.	REG SEL Indication	1111 111 111 111 111	
470.	REG SEL Indication	1111 101 111 111 111	
473.	REG SEL Indication	1111 110 111 111 111	
476.	REG SEL Indication	1111 111 011 111 111	
479.	REG SEL Indication	1111 111 101 111 111	
482.	REG SEL Indication	1111 111 110 111 111	

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NO. 05787
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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
485.	REG SEL Indication	1111 111 111 011 111	
488.	REG SEL Indication	1111 111 111 101 111	
491.	REG SEL Indication	1111 111 111 110 111	
494.	REG SEL Indication	1111 111 111 111 011	
497.	REG SEL Indication	1111 111 111 111 101	
500.	REG SEL Indication	1111 111 111 111 110	
501.	REG SEL Indication	Bit 14 is a zero	
502.	REG SEL Indication	Bit 14 is a one	
516.	REG SEL Indication	1100 110 101 010 101	
518.	REG SEL Indication	1100 110 000 000 000	
520.	REG SEL Indication	1100 111 010 101 010	
522.	REG SEL Indication	1100 111 111 111 111	
524.	REG SEL Indication	1100 111 111 111 111	
525.	REG SEL Indication	1100 111 111 111 111	
528.	REG SEL Indication	1100 110 111 111 111	
531.	REG SEL Indication	1100 111 011 111 111	
534.	REG SEL Indication	1100 111 101 111 111	
537.	REG SEL Indication	1100 011 110 111 111	
540.	REG SEL Indication	1100 111 111 011 111	
543.	REG SEL Indication	1100 111 111 101 111	
546.	REG SEL Indication	1100 111 111 110 111	
549.	REG SEL Indication	1100 111 111 111 011	
552.	REG SEL Indication	1100 111 111 111 101	
555.	REG SEL Indication	1100 111 111 111 110	

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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
563.	Frequency (XC 191)	51,200.00 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4A	
	Droop (E)	NMT 0.2A	
	Noise (F)	NMT 0.4 volts p-p	
564.	Frequency (XC 048)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4A	
	Droop (E)	NMT 0.2A	
	Noise (F)	NMT 0.4 volt p-p	
565.	Frequency (XC139)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4A	
	Droop (E)	NMT 0.2A	
	Noise (F)	NMT 0.4 volt p-p	

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Step	Parameter	Specification	Results
566.	Frequency (XC 140)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
567.	Frequency (XC 197)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
568.	Frequency (XC 149)	800.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	

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Step	Parameter	Specification	Results
569.	Frequency (XC 150)	800.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
570.	Frequency (XC 151)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
571.	Frequency (XC 152)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	

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Step	Parameter	Specification	Results
572.	Frequency (XC 155)	12,800.00 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
573.	Frequency (XC 901)	25,600.00 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
574.	Frequency (XC 052)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	

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Step	Parameter	Specification	Results
	Rise Time (C)	NMT 0.2 μ sec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	

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INITIAL TDRR 35464 D.S. PGS. 12

JOB INPUT/OUTPUT REGISTERS TEST

SUBSYSTEM Computer

ASSY. Block II C-Computer

DESCRIPTION

Tests the operation of the computer input-output channels 5, 6, 12, 30, 31, 32, and 33. Procedures for checking input-output and continuous interface signals are also provided.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	3-22-68	35897	20, 23	7	EA 02	-
B	8-6-68	36665	15	-	EA BD	-

REFERENCES JDC's 05401, 05408, 05413, 05414, ND-1021042, ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface panels are set-up as specified in JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the XY and RDC Interface panels of the CTS.

3. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

4. On the RDC Interface panel, set the CHV METERS switch to the DCVM position.

OPERATION

5. Press the LOAD CHAN V 2K OHMS and LOAD CHAN V 1K OHMS annunciators on the RDC Interface panel to energize.

6. Test signals RD086 and RD087 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 301.

b. Observe the digital voltmeter indication on the Power Control panel. Record on data sheet.

c. Press the LOAD CHAN V 2K OHMS annunciator to the off position.

7. Test signals RD166 and RD861 as follows:

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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a. Set the CHANNEL V switches to position 305.

b. Observe the digital voltmeter indication. Record on data sheet.

8. Test signals RD863 and RD869 as follows:

a. Set the CHANNEL V switches to position 306.

b. Observe the digital voltmeter indication. Record on data sheet.

9. Test signals RD865 and RD904 as follows:

a. Set the CHANNEL V switches to position 307.

b. Observe the digital voltmeter indication. Record on data sheet.

10. Test signals RD866 and RD867 as follows:

a. Set the CHANNEL V switches to 308.

b. Observe the digital voltmeter indication. Record on data sheet.

11. Test signals RD868 and RD870 as follows:

a. Press the LOAD CHAN V 1K OHMS annunciator to the off position, and press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 309.

c. Observe the digital voltmeter indication. Record on data sheet.

12. Test signals RD877 and RD878 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position, and press the LOAD CHAN V 1K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 313.

c. Observe the digital voltmeter indication. Record on data sheet.

13. Test signal RD091 as follows:

a. Press the LOAD CHAN V 1K OHMS annunciator to the off position, and press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 302.

c. Observe the digital voltmeter indication. Record on data sheet.

14. Test signal RD101 as follows:

a. Set the CHANNEL V switches to position 303.

b. Observe the digital voltmeter indication. Record on data sheet.

15. Test signal RD907 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position, and press the LOAD CHAN V 1K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 310.

c. Observe the digital voltmeter indication. Record on data sheet.

16. Test signal RD874 as follows:

a. Set the CHANNEL V switches to position 311.

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b. Observe the digital voltmeter indication. Record on data sheet.

17. Test signal RD876 as follows:

a. Press the LOAD CHAN V 1K OHMS annunciator to the off position and press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 312.

c. Observe the digital voltmeter indication. Record on data sheet.

18. Test signal RD879 as follows:

a. Set the CHANNEL V switches to position 314.

b. Observe the digital voltmeter indication. Record on data sheet.

19. Test signal RD251 as follows:

a. Set the CHANNEL V switches to position 319.

b. Observe the digital voltmeter indication (0 vdc). Record on data sheet.

20. Test signal RD903 as follows:

a. Set the CHANNEL V switches to position 401.

b. Observe the digital voltmeter indication. Record on data sheet.

21. Test signal RD175 as follows:

a. Set the CHANNEL V switches to position 402.

b. Observe the digital voltmeter indication (2 vdc). Record on data sheet.

22. Test signal RD176 as follows:

a. Set the CHANNEL V switches to position 403.

b. Observe the digital voltmeter indication (7.0 vdc). Record on data sheet.

23. Test signal RD177 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position and press the LOAD CHAN V 1K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 411.

c. Observe the digital voltmeter indication (2 vdc.) Record on data sheet.

24. Press LOAD CHAN V 1K OHMS to de-energize.

25. Set the CHANNEL V switches to position 101.

CHANNEL 5 CHECK

26. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00125.

27. Verify that the RZ display is 0000 000 000 000 101.

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28. Verify that the REG SEL display is 0000 000 001 010 101.

29. Press the CHANNEL button.

30. Press the EXECUTE button.

31. Verify that the LINC indicator is on.

32. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

33. Verify that the RZ display is 0000 000 000 000 101.

34. Press the CHANNEL button.

35. Press the EXECUTE button.

36. Verify that the OINC indicator is on.

37. Verify that the REG SEL display is 0000 000 001 010 101. Stamp data sheet.

38. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00252.

39. Verify that the RZ display is 0000 000 000 000 101.

40. Verify that the REG SEL display is 0000 000 010 101 010.

41. Press the CHANNEL button.

42. Press the EXECUTE button.

43. Verify that the LINC indicator is on.

44. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

45. Verify that the RZ display is 0000 000 000 000 101.

46. Press the CHANNEL button.

47. Press the EXECUTE button.

48. Verify that the OINC indicator is on.

49. Verify that the REG SEL display is 0000 000 010 101 010. Stamp data sheet.

50. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00000.

51. Verify that the RZ display is 0000 000 000 000 101.

52. Verify that the REG SEL display is 0000 000 000 000 000.

53. Press the CHANNEL button.

54. Press the EXECUTE button.

55. Verify that the LINC indicator is on.

56. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

57. Verify that the RZ display is 0000 000 000 000 101.

58. Press the CHANNEL button.

59. Press the EXECUTE button.

60. Verify that the OINC indicator is on.

61. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

62. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00377.

63. Verify that the RZ display is 0000 000 000 000 101.

64. Verify that the REG SEL display is 0000 000 011 111 111.

65. Press the CHANNEL button.

66. Press the EXECUTE button.

67. Verify that the LINC indicator is on.

68. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

69. Verify that the RZ display is 0000 000 000 000 101.

70. Press the CHANNEL button.

71. Press the EXECUTE button.

72. Verify that the OINC indicator is on.

73. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

74. Press FRESH START.

75. Press the READ-AGC pushbutton.

a. Press the CL Key.

b. Press Keys 0005.

76. Verify that the RZ display is 0000 000 000 000 101.

77. Press the CHANNEL button.

78. Press the EXECUTE button.

79. Verify that the OINC indicator is on.

80. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

DC OUTPUT TEST

81. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00377.

82. Verify that the RZ display is 0000 000 000 000 101.

83. Verify that the REG SEL display is 0000 000 011 111 111.

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84. Press the CHANNEL button.

85. Press the EXECUTE button.

86. Verify that the LINC indicator is on.

87. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

88. Verify that the RZ display is 0000 000 000 000 101.

89. Press the CHANNEL button.

90. Press the EXECUTE button.

91. Verify that the OINC indicator is on.

92. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

93. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

94. Set the CHV METERS switch on the RDC Interface panel to the DCVM position.

95. Depress the LOAD CHAN V 1K OHMS annunciator on the RDC Interface panel to energize.

96. Test signal CB801 as follows:

a. Set the CHANNEL V switch on the RDC Interface panel to position 601.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

97. Test signal CB806 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 602.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

98. Test signal CB805 as follows:

a. Set the CHANNEL V switches to position 603.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

99. Test signal CB802 as follows:

a. Set the CHANNEL V switches to position 604.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

100. Test signal CB803 as follows:

a. Set the CHANNEL V switches to position 605.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

101. Test signal CB808 as follows:

a. Set the CHANNEL V switches to position 606.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

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102. Test signal CB807 as follows:

a. Set the CHANNEL V switches to position 607.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

103. Test signal CB804 as follows:

a. Set the CHANNEL V switches to position 608.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

104. Set the CHV METERS switch to the OFF position.

105. Press LOAD CHAN V 1K OHMS to de-energize.

106. Set the CHANNEL V switches to position 101.

CHANNEL 6 CHECK

107. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00125.

108. Verify that the RZ display is 0000 000 000 000 110.

109. Verify that the REG SEL display is 0000 000 001 010 101.

110. Press the CHANNEL button.

111. Press the EXECUTE button.

112. Verify that the LINC indicator is on.

113. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

114. Verify that the RZ display is 0000 000 000 000 110.

115. Press the CHANNEL button.

116. Press the EXECUTE button.

117. Verify that the OINC indicator is on.

118. Verify that the REG SEL display is 0000 000 001 010 101. Stamp data sheet.

119. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00252.

120. Verify that the RZ display is 0000 000 000 000 110.

121. Verify that the REG SEL display is 0000 000 010 101 010.

122. Press the CHANNEL button.

123. Press the EXECUTE button.

124. Verify that the LINC indicator is on.

125. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

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b. Press Keys 0006.

126. Verify that the RZ display is 0000 000 000 000 110.

127. Press the CHANNEL button.

128. Press the EXECUTE button.

129. Verify that the OINC indicator is on.

130. Verify that the REG SEL display is 0000 000 010 101 010. Stamp data sheet.

131. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00000.

132. Verify that the RZ display is 0000 000 000 000 110.

133. Verify that the REG SEL display is 0000 000 000 000 000.

134. Press the CHANNEL button.

135. Press the EXECUTE button.

136. Verify that the LINC indicator is on.

137. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

138. Verify that the RZ display is 0000 000 000 000 110.

139. Press the CHANNEL button.

140. Press the EXECUTE button.

141. Verify that the OINC indicator is on.

142. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

143. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00377.

144. Verify that the RZ display is 0000 000 000 000 110.

145. Verify that the REG SEL display is 0000 000 011 111 111.

146. Press the CHANNEL button.

147. Press the EXECUTE button.

148. Verify that the LINC indicator is on.

149. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

150. Verify that the RZ display is 0000 000 000 000 110.

151. Press the CHANNEL button.

152. Press the EXECUTE button.

153. Verify that the OINC indicator is on.

154. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

155. Press FRESH START.

156. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

157. Verify that the RZ display is 0000 000 000 000 110.

158. Press the CHANNEL button.

159. Press the EXECUTE button.

160. Verify that the OINC indicator is on.

161. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

DC OUTPUT TEST

162. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00377.

163. Verify that the RZ display is 0000 000 000 000 110.

164. Verify that the REG SEL display is 0000 000 011 111 111.

165. Press the CHANNEL button.

166. Press the EXECUTE button.

167. Verify that the LINC indicator is on.

168. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

169. Verify that the RZ display is 0000 000 000 000 110.

170. Press the CHANNEL button.

171. Press the EXECUTE button.

172. Verify that the OINC indicator is on.

173. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

174. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

175. Set the CHV METERS switch on the RDC Interface panel to the DCVM position.

176. Press the LOAD CHAN V 1K OHMS annunciator on the RDC Interface panel to energize.

177. Test signal CB813 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 609.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

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178. Test signal CB816 as follows:

a. Set the CHANNEL V switches to position 610.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

179. Test signal CB815 as follows:

a. Set the CHANNEL V switches to position 611.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

180. Test signal CB814 as follows:

a. Set the CHANNEL V switches to position 612.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

181. Test signal CB809 as follows:

a. Set the CHANNEL V switches to position 613.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

182. Test signal CB812 as follows:

a. Set the CHANNEL V switches to position 614.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

183. Test signal CB811 as follows:

a. Set the CHANNEL V switches to position 615.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

184. Test signal CB810 as follows:

a. Set the CHANNEL V switches to position 616.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

185. Set the CHV METERS switch to the OFF position.

186. Press LOAD CHAN V 1K OHMS to de-energize.

187. Set the CHANNEL V switches to position 101.

188. Press the KEYBOARD LOAD pushbutton indicator.

189. Press the CL Key.

190. Press Keys 00012.

191. Press Keys 52525.

192. Verify that the RZ display is 0000 000 000 001 010.

193. Verify that the REG SEL display is 0101 010 101 010 101.

194. Press the CHANNEL button.

195. Press the EXECUTE button.

196. Verify that the LINC indicator is on.

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197. Press the READ-AGC pushbutton indicator.

198. Press the CL Key.

199. Press Keys 0012.

200. Verify that the RZ display is 0000 000 000 001 010.

201. Press the CHANNEL button.

202. Press the EXECUTE button.

203. Verify that the OINC indicator is on.

204. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

205. Press the KEYBOARD LOAD pushbutton indicator.

206. Press the CL Key.

207. Press Keys 00012.

208. Press Keys 25252.

209. Verify that the RZ display is 0000 000 000 001 010.

210. Verify that the REG SEL display is 0010 101 010 101 010.

211. Press the CHANNEL button.

212. Press the EXECUTE button.

213. Verify that the LINC indicator is on.

214. Press the READ-AGC pushbutton indicator.

215. Press the CL Key.

216. Press Keys 0012.

217. Verify that the RZ display is 0000 000 000 001 010.

218. Press the CHANNEL button.

219. Press the EXECUTE button.

220. Verify that the OINC indicator is on.

221. Verify that the REG SEL display is 0010 101 010 101 010. Stamp data sheet.

222. Press the KEYBOARD LOAD pushbutton indicator.

223. Press the CL Key.

224. Press Keys 00012.

225. Press Keys 00000.

226. Verify that the RZ display is 0000 000 000 001 010.

227. Verify that the REG SEL display is 0000 000 000 000 000.

228. Press the CHANNEL button.

229. Press the EXECUTE button.

230. Verify that the LINC indicator is on.

231. Press the READ-AGC pushbutton indicator.

232. Press the CL Key.

233. Press Keys 0012.

234. Verify that the RZ display is 0000 000 000 001 010.

235. Press the CHANNEL button.

236. Press the EXECUTE button.

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237. Verify that the OINC indicator is on.

238. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

239. Press the KEYBOARD LOAD pushbutton indicator.

240. Press the CL Key.

241. Press Keys 00012.

242. Press Keys 77777.

243. Verify that the RZ display is 0000 000 000 001 010.

244. Verify that the REG SEL display is 0111 111 111 111 111.

245. Press the CHANNEL button.

246. Press the EXECUTE button.

247. Verify that the LINC indicator is on.

248. Press the READ-AGC pushbutton indicator.

249. Press the CL Key.

250. Press Keys 0012.

251. Verify that the RZ display is 0000 000 000 001 010.

252. Press the CHANNEL button.

253. Press the EXECUTE button.

254. Verify that the OINC indicator is on.

255. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

256. Press FRESH START.

257. Press the CL Key.

258. Press Keys 0012.

259. Verify that the RZ display is 0000 000 000 001 010.

260. Press the CHANNEL button.

261. Press the EXECUTE button.

262. Verify that the OINC indicator is on.

263. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

264. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

265. On the RDC Interface panel:

a. Set the CHV METERS switch to the DCVM position.

b. Depress the LOAD CHAN V 1K OHMS annunciator to energize.

266. Depress the LOAD CHAN V 2K OHMS annunciator to energize.

267. Test signal CB013 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 520.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

268. Press the KEYBOARD LOAD pushbutton indicator.

269. Press the CL Key.

270. Press Keys 00012.

271. Press Keys 77777.

272. Verify that the RZ display is 0000 000 000 001 010.

273. Verify that the REG SEL display is 0111 111 111 111 111.

274. Press the CHANNEL button.

275. Press the EXECUTE button.

276. Verify that the LINC indicator is on.

277. Verify that the M34 indicator (CB233) on the XY Interface panel is on. Stamp data sheet.

278. Verify that the M36 indicator (CB234) on the XY Interface panel is on. Stamp data sheet.

279. Test signal CB909 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position.

b. Set the CHANNEL V switches to position 405.

c. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

280. Test signal CB160 as follows:

a. Set the CHANNEL V switches to position 406.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

281. Test signal CB906 as follows:

a. Set the CHANNEL V switch to position 501.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

282. Test signal CB185 as follows:

a. Set the CHANNEL V switches to position 502.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

283. Test signal CB186 as follows:

a. Set the CHANNEL V switches to position 503.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

284. Test signal CB902 as follows:

a. Set the CHANNEL V switches to position 504.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

285. Test signal CB162. as follows:

a. Set the CHANNEL V switches to position 505.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

286. Test signal CB011 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 506.

c. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

287. Test signal CB161 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position.

b. Set the CHANNEL V switches to position 507.

c. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

288. Test signal CB194 as follows:

a. Set the CHANNEL V switches to position 508.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

289. Test signal CB195 as follows:

a. Set the CHANNEL V switches to position 509.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

290. Test signal CB196 as follows:

a. Set the CHANNEL V switches to position 510.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

291. Test signal CB841 as follows:

a. Set the CHANNEL V switches to position 617.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

292. Set the CHV METERS switch to the OFF position.

293. Press LOAD CHAN V 1K OHMS to de-energize.

CHANNEL 30 CHECK

294. Press the READ-AGC indicator switch to the on (illuminated) position.

295. Press Keys CL, 0030.

296. Verify that the RZ display is 0000 000 000 011 000.

297. Press the CHANNEL button.

298. Press the EXECUTE button.

299. Verify that the OINC indicator is on.

300. Press the FORCED READ indicator switch to the on (illuminated) position.

301. Set the T12 COUNTER STOP switch to the OFF position.

302. Press the PROCEED button.

303. Verify that the OINC indicator is on.

304. Verify that the STPIT indicator is off.

NOTE: The annunciators
listed in this procedure are
indicator switches, which
are alternately depressed
to energize (illuminated)
and alternately depressed
to de-energize (extinguished).

305. Energize the following annunciators:

a. CH30-14/IN0-14

b. CH30-12/IN0-12

c. CH30-10/IN0-10

d. CH30-8/IN0-8

e. CH30-6/IN0-6

f. CH30-4/IN0-4

g. CH30-2/IN0-2

306. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

307. Energize the following annunciators:

a. CH30-15/IN0-15

b. CH30-13/IN0-13

c. CH30-11/IN0-11

d. CH30-9/IN0-9

e. CH30-7/IN0-7

f. CH30-5/IN0-5

g. CH30-3/IN0-3

h. CH30-1/IN0-1

308. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

309. De-energize the following annunciators:

a. CH30-14/IN0-14

b. CH30-12/IN0-12

c. CH30-10/IN0-10

d. CH30-8/IN0-8

e. CH30-6/IN0-6

f. CH30-4/IN0-4

g. CH30-2/IN0-2

310. Verify that the REG SEL display is 0010 101 010 101 010. Stamp data sheet.

311. De-energize the following annunciators:

a. CH30-15/IN0-15

b. CH30-13/IN0-13

c. CH30-11/IN0-11

d. CH30-9/IN0-9

e. CH30-7/IN0-7

f. CH30-5/IN0-5

g. CH30-3/IN0-3

h. CH30-1/IN0-1

312. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

High Zero Test

313. Set the DE MARGINS switch to the V0 position.

314. Energize the CH30-15/IN0-15 through CH30-1/IN0-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

315. De-energize the CH30-15/IN0-15 through CH30-1/IN0-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

316. Set the DE MARGINS switch to the V1 position.

317. Energize the CH30-15/IN0-15 annunciator.

318. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

319. De-energize the CH30-15/IN0-15 annunciator.

320. Energize the CH30-14/IN0-14 annunciator.

321. Verify that the REG SEL display is 1101 111 111 111 111. Stamp data sheet.

322. De-energize the CH30-14/IN0-14 annunciator.

323. Energize the CH30-13/IN0-13 annunciator.

324. Verify that the REG SEL display is 1110 111 111 111 111. Stamp data sheet.

325. De-energize the CH30-13/IN0-13 annunciator.

326. Energize the CH30-12/IN0-12 annunciator.

327. Verify that the REG SEL display is 1111 011 111 111 111. Stamp data sheet.

328. De-energize the CH30-12/IN0-12 annunciator.

329. Energize the CH30-11/IN0-11 annunciator.

330. Verify that the REG SEL display is 1111 101 111 111 111. Stamp data sheet.

331. De-energize the CH30-11/IN0-11 annunciator.

332. Energize the CH30-10/IN0-10 annunciator.

333. Verify that the REG SEL display is 1111 110 111 111 111. Stamp data sheet.

334. De-energize the CH30-10/IN0-10 annunciator.

335. Energize the CH30-9/IN0-9 annunciator.

336. Verify that the REG SEL display is 1111 111 011 111 111. Stamp data sheet.

337. De-energize the CH30-9/IN0-9 annunciator.

338. Energize the CH30-8/IN0-8 annunciator.

339. Verify that the REG SEL display is 1111 111 101 111 111. Stamp data sheet.

340. De-energize the CH30-8/IN0-8 annunciator.

341. Energize the CH30-7/IN0-7 annunciator.

342. Verify that the REG SEL display is 1111 111 110 111 111. Stamp data sheet.

343. De-energize the CH30-7/IN0-7 annunciator.

344. Energize the CH30-6/IN0-6 annunciator.

345. Verify that the REG SEL display is 1111 111 111 011 111. Stamp data sheet.

346. De-energize the CH30-6/IN0-6 annunciator.

347. Energize the CH30-5/IN0-5 annunciator.

348. Verify that the REG SEL display is 1111 111 111 101 111. Stamp data sheet.

349. De-energize the CH-5/IN0-5 annunciator.

350. Energize the CH30-4/IN0-4 annunciator.

351. Verify that the REG SEL display is 1111 111 111 110 111. Stamp data sheet.

352. De-energize the CH30-4/IN0-4 annunciator.

353. Energize the CH30-3/IN0-3 annunciator.

354. Verify that the REG SEL display is 1111 111 111 111 011. Stamp data sheet.

355. De-energize the CH30-3/IN0-3 annunciator.

356. Energize the CH30-2/IN0-2 annunciator.

357. Verify that the REG SEL display is 1111 111 111 111 101. Stamp data sheet.

358. De-energize the CH30-2/IN0-2 annunciator.

359. Energize the CH30-1/IN0-1 annunciator.

360. Verify that the REG SEL display is 1111 111 111 111 110. Stamp data sheet.

361. De-energize the CH30-1/IN0-1 annunciator.

359 Delete

362. Set the DE MARGINS switch to the NORM position.

363. Set the T12 COUNTER STOP switch to the ON position.

364. De-energize the FORCED READ annunciator.

CHANNEL 31 CHECK

365. Press Keys CL, 0031.

366. Verify that the RZ display is 0000 000 000 011 001.

367. Press the CHANNEL button.

368. Press the EXECUTE button.

369. Verify that the OINC indicator is on.

370. Press the FORCED READ indicator switch to the on (illuminated) position.

371. Set the T12 COUNTER STOP switch to the OFF position.

372. Press the PROCEED button.

373. Verify that the OINC indicator is on.

374. Verify that the STPIT indicator is off.

375. Energize the following annunciators:

a. CH31-14/IN2-14

b. CH31-12/IN2-12

c. CH31-10/IN2-10

d. CH31-8/IN2-8

e. CH31-6/IN2-6

f. CH31-4/IN2-4

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g. CH31-2/IN2-2

376. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

377. Energize the following annunciators:

a. CH31-15/IN2-15

b. CH31-13/IN2-13

c. CH31-11/IN2-11

d. CH31-9/IN2-9

e. CH31-7/IN2-7

f. CH31-5/IN2-5

g. CH31-3/IN2-3

h. CH31-1/IN2-1

378. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

379. De-energize the following annunciators:

a. CH31-14/IN2-14

b. CH31-12/IN2-12

c. CH31-10/IN2-10

d. CH31-8/IN2-8

e. CH31-6/IN2-6

f. CH31-4/IN2-4

g. CH31-2/IN2-2

380. Verify that the REG SEL display is 0010 101 010 101 010. Stamp data sheet.

381. De-energize the following annunciators:

a. CH31-15/IN2-15

b. CH31-13/IN2-13

c. CH31-11/IN2-11

d. CH31-9/IN2-9

e. CH31-7/IN2-7

f. CH31-5/IN2-5

g. CH31-3/IN2-3

h. CH31-1/IN2-1

382. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

High Zero Test

383. Set the DE MARGINS switch to the V0 position.

384. Energize the CH31-15/IN2-15 through CH31-1/IN2-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

385. De-energize the CH31-15/IN2-15 through CH31-1/IN2-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

386. Set the DE MARGINS switch to the V1 position.

387. Energize the CH31-15/IN2-15 annunciator.

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388. Verify that the REG SEL display is 0011 111 111 111 111. Stamp data sheet.

389. De-energize the CH31-15/IN2-15 annunciator.

390. Energize the CH31-14/IN2-14 annunciator.

391. Verify that the REG SEL display is 1101 111 111 111 111. Stamp data sheet.

392. De-energize the CH31-14/IN2-14 annunciator.

393. Energize the CH31-13/IN2-13 annunciator.

394. Verify that the REG SEL display is 1110 111 111 111 111. Stamp data sheet.

395. De-energize the CH31-13/IN2-13 annunciator.

396. Energize the CH31-12/IN2-12 annunciator.

397. Verify that the REG SEL display is 1111 011 111 111 111. Stamp data sheet.

398. De-energize the CH31-12/IN2-12 annunciator.

399. Energize the CH31-11/IN2-11 annunciator.

400. Verify that the REG SEL display is 1111 101 111 111 111. Stamp data sheet.

401. De-energize the CH31-11/IN2-11 annunciator.

402. Energize the CH31-10/IN2-10 annunciator.

403. Verify that the REG SEL display is 1111 110 111 111 111. Stamp data sheet.

404. De-energize the CH31-10/IN2-10 annunciator.

405. Energize the CH31-9/IN2-9 annunciator.

406. Verify that the REG SEL display is 1111 111 011 111 111. Stamp data sheet.

407. De-energize the CH31-9/IN2-9 annunciator.

408. Energize the CH31-8/IN2-8 annunciator.

409. Verify that the REG SEL display is 1111 111 101 111 111. Stamp data sheet.

410. De-energize the CH31-8/IN2-8 annunciator.

411. Energize the CH31-7/IN2-7 annunciator.

412. Verify that the REG SEL display is 1111 111 110 111 111. Stamp data sheet.

413. De-energize the CH31-7/IN2-7 annunciator.

414. Energize the CH31-6/IN2-6 annunciator.

415. Verify that the REG SEL display is 1111 111 111 011 111. Stamp data sheet.

416. De-energize the CH31-6/IN2-6 annunciator.

417. Energize the CH31-5/IN2-5 annunciator.

418. Verify that the REG SEL display is 1111 111 111 101 111. Stamp data sheet.

419. De-energize the CH31-5/IN2-5 annunciator.

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420. Energize the CH31-4/IN2-4 annunciator.

421. Verify that the REG SEL display is 1111 111 111 110 111. Stamp data sheet.

422. De-energize the CH31-4/IN2-4 annunciator.

423. Energize the CH31-3/IN2-3 annunciator.

424. Verify that the REG SEL display is 1111 111 111 111 011. Stamp data sheet.

425. De-energize the CH31-3/IN2-3 annunciator.

426. Energize the CH31-2/IN2-2 annunciator.

427. Verify that the REG SEL display is 1111 111 111 111 101. Stamp data sheet.

428. De-energize the CH31-2/IN2-2 annunciator.

429. Energize the CH31-1/IN2-1 annunciator.

430. Verify that the REG SEL display is 1111 111 111 111 110. Stamp data sheet.

431. De-energize the CH31-1/IN2-1 annunciator.

432. Set the DE MARGINS switch to the NORM position.

433. Set the T12 COUNTER STOP switch to the ON position.

434. De-energize the FORCED READ annunciator.

CHANNEL 32 CHECK

NOTE: If ECP 518 has been incorporated, CH32-14/IN3-14 will be functional as detailed in the steps specifying the state of the REG SEL display.

435. Press Keys CL, 0032.

436. Verify that the RZ display is 0000 000 000 011 010.

437. Press the CHANNEL button.

438. Press the EXECUTE button.

439. Verify that the OINC indicator is on.

440. Press the FORCED READ indicator switch to the on (illuminated) position.

441. Set the T12 COUNTER STOP switch to the OFF position.

442. Press the PROCEED button.

443. Verify that the OINC indicator is on.

444. Verify that the STPIT indicator is off.

445. Energize the following annunciators:

a. CH32-14/IN3-14

b. CH32-12/IN3-12

c. CH32-10/IN3-10

d. CH32-8/IN3-8

e. CH32-6/IN3-6

f. CH32-4/IN3-4

g. CH32-2/IN3-2

446. Verify that the REG SEL display is 1101 110 101 010 101. (Without ECP 518, 1111 110 101 010 101). Stamp data sheet.

447. Energize the following annunciators:

a. CH32-15/IN3-15
b. CH32-13/IN3-13
c. CH32-11/IN3-11
d. CH32-9/IN3-9
e. CH32-7/IN3-7
f. CH32-5/IN3-5
g. CH32-3/IN3-3
h. CH32-1/IN3-1

448. Verify that the REG SEL display is 1101 100 000 000 000. (Without ECP 518, 1111 100 000 000 000). Stamp data sheet.

449. De-energize the following annunciators:

a. CH32-14/IN3-14
b. CH32-12/IN3-12
c. CH32-10/IN3-10
d. CH32-8/IN3-8
e. CH32-6/IN3-6
f. CH32-4/IN3-4
g. CH32-2/IN3-2

450. Verify that the REG SEL display is 1111 101 010 101 010. Stamp data sheet.

451. De-energize the following annunciators:

a. CH32-15/IN3-15
b. CH32-13/IN3-13
c. CH32-11/IN3-11
d. CH32-9/IN3-9
e. CH32-7/IN3-7
f. CH32-5/IN3-5
g. CH32-3/IN3-3
h. CH32-1/IN3-1

452. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

High Zero Test

453. Set the DE MARGINS switch to the V0 position.

454. Energize the CH32-15/IN3-15 through CH32-1/IN3-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

455. De-energize the CH32-15/IN3-15 through CH32-1/IN3-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

456. Set the DE MARGINS switch to the V1 position.

457. Energize the CH32-15/IN3-15 annunciator.

458. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

459. De-energize the CH32-15/IN3-15 annunciator.

460. Energize the CH32-14/IN3-14 annunciator.

461. Verify that the REG SEL display is 1101 111 111 111 111. (Without ECP 518, 1111 111 111 111 111). Stamp data sheet.

462. De-energize the CH32-14/IN3-14 annunciator.

463. Energize the CH32-13/IN3-13 annunciator.

464. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

465. De-energize the CH32-13/IN3-13 annunciator.

466. Energize the CH32-12/IN3-12 annunciator.

467. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

468. De-energize the CH32-12/IN3-12 annunciator.

469. Energize the CH32-11/IN3-11 annunciator.

470. Verify that the REG SEL display is 1111 101 111 111 111. Stamp data sheet.

471. De-energize the CH32-11/IN3-11 annunciator.

472. Energize the CH32-10/IN3-10 annunciator.

473. Verify that the REG SEL display is 1111 110 111 111 111. Stamp data sheet.

474. De-energize the CH32-10/IN3-10 annunciator.

475. Energize the CH32-9/IN3-9 annunciator.

476. Verify that the REG SEL display is 1111 111 011 111 111. Stamp data sheet.

477. De-energize the CH32-9/IN3-9 annunciator.

478. Energize the CH32-8/IN3-8 annunciator.

479. Verify that the REG SEL display is 1111 111 101 111 111. Stamp data sheet.

480. De-energize the CH32-8/IN3-8 annunciator.

481. Energize the CH32-7/IN3-7 annunciator.

482. Verify that the REG SEL display is 1111 111 110 111 111. Stamp data sheet.

483. De-energize the CH32-7/IN3-7 annunciator.

484. Energize the CH32-6/IN3-6 annunciator.

485. Verify that the REG SEL display is 1111 111 111 011 111. Stamp data sheet.

486. De-energize the CH32-6/IN3-6 annunciator.

487. Energize the CH32-5/IN3-5 annunciator.

488. Verify that the REG SEL display is 1111 111 111 101 111. Stamp data sheet.

489. De-energize the CH32-5/IN3-5 annunciator.

490. Energize the CH32-4/IN3-4 annunciator.

491. Verify that the REG SEL display is 1111 111 111 110 111. Stamp data sheet.

492. De-energize the CH32-4/IN3-4 annunciator.

493. Energize the CH32-3/IN3-3 annunciator.

494. Verify that the REG SEL display is 1111 111 111 111 011. Stamp data sheet.

495. De-energize the CH32-3/IN3-3 annunciator.

496. Energize the CH32-2/IN3-2 annunciator.

497. Verify that the REG SEL display is 1111 111 111 111 101. Stamp data sheet.

498. De-energize the CH32-2/IN3-2 annunciator.

499. Energize the CH32-1/IN3-1 annunciator.

500. Verify that the REG SEL display is 1111 111 111 111 110. Stamp data sheet. De-energize the CH32-1/IN3-1 annunciator and set the DE MARGINS switch to the NORMAL position.

NOTE: If ECP 518 has not been incorporated, do not perform steps 501 and 502.

501. Depress the DSKY PRO (STBY) pushbutton, and hold depressed just long enough to verify that bit 14 of the REG SEL display is a zero (1101 111 111 111 111). Stamp data sheet.

502. Verify that bit 14 of the REG SEL display switched back to a one (1111 111 111 111 111) when the DSKY PRO (STBY) pushbutton was released. Stamp data sheet.

503. Set the T12 COUNTER STOP switch to the ON position.

504. De-energize the FORCED READ annunciator.

CHANNEL 33 CHECK

505. Press Keys CL, 0033.

506. Verify that the RZ display is 0000 000 000 011 011.

507. Press the CHANNEL button.

508. Press the EXECUTE button.

509. Verify that the OINC indicator is on.

510. Press the FORCED READ indicator switch to the on (illuminated) position.

511. Set the T12 COUNTER STOP switch to the OFF position.

512. Press the PROCEED button.

513. Verify that the OINC indicator is on.

514. Verify that the STPIT indicator is off.

515. Energize the following annunciators:

a. CH33-10
b. CH33-8
c. CH33-6
d. CH33-4
e. CH33-2

516. Verify that the REG SEL display is 1100 110 101 010 101. Stamp data sheet.

517. Energize the following annunciators:

a. CH33-9
b. CH33-7
c. CH33-5
d. CH33-3
e. CH33-1

518. Verify that the REG SEL display is 1100 110 000 000 000. Stamp data sheet.

519. De-energize the following annunciators:

a. CH33-10
b. CH33-8
c. CH33-6
d. CH33-4
e. CH33-2

520. Verify that the REG SEL display is 1100 111 010 101 010. Stamp data sheet.

521. De-energize the following annunciators:

a. CH33-9
b. CH33-7
c. CH33-5
d. CH33-3
e. CH33-1

522. Verify that the REG SEL display is 1100 111 111 111 111. Stamp data sheet.

High Zero Test

523. Set the DE MARGINS switch to the V0 position.

524. Energize the CH33-10 through CH33-1 annunciators and verify that the REG SEL display remains 1100 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

525. De-energize the CH33-10 through CH33-1 annunciators and verify that the REG SEL display remains 1100 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

526. Set the DE MARGINS switch to the V1 position.

527. Energize the CH33-10 annunciator.

528. Verify that the REG SEL display is 1100 110 111 111 111. Stamp data sheet.

529. De-energize the CH33-10 annunciator.

530. Energize the CH33-9 annunciator.

531. Verify that the REG SEL display is 1100 111 011 111 111. Stamp data sheet.

532. De-energize the CH33-9 annunciator.

533. Energize the CH33-8 annunciator.

534. Verify that the REG SEL display is 1100 111 101 111 111. Stamp data sheet.

535. De-energize the CH33-8 annunciator.

536. Energize the CH33-7 annunciator.

537. Verify that the REG SEL display is 1100 111 110 111 111. Stamp data sheet.

538. De-energize the CH33-7 annunciator.

539. Energize the CH33-6 annunciator.

540. Verify that the REG SEL display is 1100 111 111 011 111. Stamp data sheet.

541. De-energize the CH33-6 annunciator.

542. Energize the CH33-5 annunciator.

543. Verify that the REG SEL display is 1100 111 111 101 111. Stamp data sheet.

544. De-energize the CH33-5 annunciator.

545. Energize the CH33-4 annunciator.

546. Verify that the REG SEL display is 1100 111 111 110 111. Stamp data sheet.

547. De-energize the CH33-4 annunciator.

548. Energize the CH33-3 annunciator.

549. Verify that the REG SEL display is 1100 111 111 111 011. Stamp data sheet.

550. De-energize the CH33-3 annunciator.

551. Energize the CH33-2 annunciator.

552. Verify that the REG SEL display is 1100 111 111 111 101. Stamp data sheet.

553. De-energize the CH33-2 annunciator.

554. Energize the CH33-1 annunciator.

555. Verify that the REG SEL display is 1100 111 111 111 110. Stamp data sheet.

556. De-energize the CH33-1 annunciator.

557. Set the DE MARGINS switch to the NORM position.

558. Set the T12 COUNTER STOP switch to the ON position.

559. De-energize the FORCED READ annunciator.

CONTINUOUS SIGNALS CHECK

560. Perform the preparation section of Frequency Measurement, JDC 05401.

561. Perform the preparation section of Pulse Measurement, JDC 05405.

562. On the XY Interface panel:

a. Set the SCOPE switch to the DIFF S position.

b. Press LOAD CHAN S 510 OH48 to energize.

563. Test signal XC 191 as follows:

a. Set the CHANNEL S switches to the 104 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (51,200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

564. Test signal XC048 as follows:

a. Set the CHANNEL S switches to the 105 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the Frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

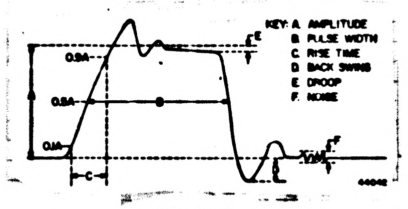

Figure 1

565. Test signal XC139 as follows:

a. Set the CHANNEL S switches to the 107 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

566. Test signal XC140 as follows:

a. Set the CHANNEL S switches to the 108 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

567. Test signal XC197 as follows:

a. Set the CHANNEL S switches to the 109 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

568. Test signal XC149 as follows:

a. Set the CHANNEL S switches on the XY Interface panel to the 110 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (800 cps) displayed on Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

569. Test signal XC150 as follows:

a. Set the CHANNEL S switches to the 111 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (800 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

570. Test signal XC151 as follows:

a. Set the CHANNEL S switches to the 112 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

571. Test signal XC152 as follows:

a. Set the CHANNEL S switches to the 113 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

572. Test signal XC155 as follows:

a. Set the CHANNEL S switches to the 116 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (12.8 kpps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

573. Test signal XC901 as follows:

a. Set the CHANNEL S switches to the 117 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (25.6 kpps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

574. Test signal XC062 as follows:

a. Set the CHANNEL S switches to the 118 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

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EQUIPMENT TEST
DATA SHEET 1 OF 12

JDC
NO. 05787
REV. B
INITIAL TDRR 35464

JOB INPUT/OUTPUT REGISTERS TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
6.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
7.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
8.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
9.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
10.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
11.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
12.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
13.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
14.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
15.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
16.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
17.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
18.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
19.	Digital Voltmeter Indication	0.0 (± 1.0) vdc	
20.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	

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EQUIPMENT TEST
DATA SHEET 2 OF 12

JDC
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REV. B

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
21.	Digital Voltmeter Indication	2.0 (± 0.6) vdc	
22.	Digital Voltmeter Indication	7.0 (± 0.25) vdc	
23.	Digital Voltmeter Indication	2.0 (± 0.6) vdc	
37.	REG SEL Indication	0000 000 001 010 101	
49.	REG SEL Indication	0000 000 010 101 010	
61.	REG SEL Indication	0000 000 000 000 000	
73.	REG SEL Indication	0000 000 011 111 111	
80.	REG SEL Indication	0000 000 000 000 000	
92.	REG SEL Indication	0000 000 011 111 111	
96.	Digital Voltmeter Indication	2.5 vdc	
97.	Digital Voltmeter Indication	2.5 vdc	
98.	Digital Voltmeter Indication	2.5 vdc	
99.	Digital Voltmeter Indication	2.5 vdc	
100.	Digital Voltmeter Indication	2.5 vdc	
101.	Digital Voltmeter Indication	2.5 vdc	
102.	Digital Voltmeter Indication	2.5 vdc	
103.	Digital Voltmeter Indication	2.5 vdc	
118.	REG SEL Indication	0000 000 001 010 101	
130.	REG SEL Indication	0000 000 010 101 010	
142.	REG SEL Indication	0000 000 000 000 000	
154.	REG SEL Indication	0000 000 011 111 111	
161.	REG SEL Indication	0000 000 000 000 000	

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REV. B

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
173.	REG SEL Indication	0000 000 011 111 111	
177.	Digital Voltmeter Indication	2.5 vdc	
178.	Digital Voltmeter Indication	2.5 vdc	
179.	Digital Voltmeter Indication	2.5 vdc	
180.	Digital Voltmeter Indication	2.5 vdc	
181.	Digital Voltmeter Indication	2.5 vdc	
182.	Digital Voltmeter Indication	2.5 vdc	
183.	Digital Voltmeter Indication	2.5 vdc	
184.	Digital Voltmeter Indication	2.5 vdc	
204.	REG SEL Indication	1101 010 101 010 101	
221.	REG SEL Indication	0010 101 010 101 010	
238.	REG SEL Indication	0000 000 000 000 000	
256.	REG SEL Indication	1111 111 111 111 111	
263.	REG SEL Indication	0000 000 000 000 000	
267.	Digital Voltmeter Indication	2.5 vdc	
277.	Illuminated XY Indicator	M34	
278.	Illuminated XY Indicator	M36	
279c.	Digital Voltmeter Indication	2.5 vdc	
280b.	Digital Voltmeter Indication	2.5 vdc	
281b.	Digital Voltmeter Indication	2.5 vdc	
282b.	Digital Voltmeter Indication	2.5 vdc	
283b.	Digital Voltmeter Indication	2.5 vdc	

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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
284b.	Digital Voltmeter Indication	2.5 vdc	
285b.	Digital Voltmeter Indication	2.5 vdc	
286c.	Digital Voltmeter Indication	2.5 vdc	
287c.	Digital Voltmeter Indication	2.5 vdc	
288b.	Digital Voltmeter Indication	2.5 vdc	
289b.	Digital Voltmeter Indication	2.5 vdc	
290b.	Digital Voltmeter Indication	2.5 vdc	
291b.	Digital Voltmeter Indication	2.5 vdc	
306.	REG SEL Indication	1101 010 101 010 101	
308.	REG SEL Indication	0000 000 000 000 000	
310.	REG SEL Indication	0010 101 010 101 010	
312.	REG SEL Indication	1111 111 111 111 111	
314.	REG SEL Indication	1111 111 111 111 111	
315.	REG SEL Indication	1111 111 111 111 111	
318.	REG SEL Indication	0000 000 000 000 000	
321.	REG SEL Indication	1101 111 111 111 111	
324.	REG SEL Indication	1110 111 111 111 111	
327.	REG SEL Indication	1111 011 111 111 111	
330.	REG SEL Indication	1111 101 111 111 111	
333.	REG SEL Indication	1111 110 111 111 111	
336.	REG SEL Indication	1111 111 011 111 111	
339.	REG SEL Indication	1111 111 101 111 111	

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EQUIPMENT TEST
DATA SHEET 5 OF 12

JDC
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REV. B

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
342.	REG SEL Indication	1111 111 110 111 111	
345.	REG SEL Indication	1111 111 111 011 111	
348.	REG SEL Indication	1111 111 111 101 111	
351.	REG SEL Indication	1111 111 111 110 111	
354.	REG SEL Indication	1111 111 111 111 011	
357.	REG SEL Indication	1111 111 111 111 101	
360.	REG SEL Indication	1111 111 111 111 110	
376.	REG SEL Indication	1101 010 101 010 101	
378.	REG SEL Indication	0000 000 000 000 000	
380.	REG SEL Indication	0010 101 010 101 010	
382.	REG SEL Indication	1111 111 111 111 111	
384.	REG SEL Indication	1111 111 111 111 111	
386.	REG SEL Indication	1111 111 111 111 111	
388.	REG SEL Indication	0011 111 111 111 111	
391.	REG SEL Indication	1101 111 111 111 111	
394.	REG SEL Indication	1110 111 111 111 111	
397.	REG SEL Indication	1111 011 111 111 111	
400.	REG SEL Indication	1111 101 111 111 111	
403.	REG SEL Indication	1111 110 111 111 111	
406.	REG SEL Indication	1111 111 011 111 111	
409.	REG SEL Indication	1111 111 101 111 111	
412.	REG SEL Indication	1111 111 110 111 111	

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EQUIPMENT TEST
DATA SHEET 6 OF 12

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REV. B

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
415.	REG SEL Indication	1111 111 111 011 111	
418.	REG SEL Indication	1111 111 111 101 111	
421.	REG SEL Indication	1111 111 111 110 111	
424.	REG SEL Indication	1111 111 111 111 011	
427.	REG SEL Indication	1111 111 111 111 101	
430.	REG SEL Indication	1111 111 111 111 110	
446.	REG SEL Indication	1111 110 101 010 101 (ECP 518, 1101 110 101 010 101	
448.	REG SEL Indication	1111 100 000 000 000 (ECP 518, 1101 100 000 000 000	
450.	REG SEL Indication	1111 101 010 101 010	
452.	REG SEL Indication	1111 111 111 111 111	
454.	REG SEL Indication	1111 111 111 111 111	
456.	REG SEL Indication	1111 111 111 111 111	
458.	REG SEL Indication	1111 111 111 111 111	
461.	REG SEL Indication	1111 111 111 111 111 (ECP 518, 1101 111 111 111 111	
464.	REG SEL Indication	1111 111 111 111 111	
467.	REG SEL Indication	1111 111 111 111 111	
470.	REG SEL Indication	1111 101 111 111 111	
473.	REG SEL Indication	1111 110 111 111 111	
476.	REG SEL Indication	1111 111 011 111 111	
479.	REG SEL Indication	1111 111 101 111 111	
482.	REG SEL Indication	1111 111 110 111 111	

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JDC
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REV. B

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
485.	REG SEL Indication	1111 111 111 011 111	
488.	REG SEL Indication	1111 111 111 101 111	
491.	REG SEL Indication	1111 111 111 110 111	
494.	REG SEL Indication	1111 111 111 111 011	
497.	REG SEL Indication	1111 111 111 111 101	
500.	REG SEL Indication	1111 111 111 111 110	
501.	REG SEL Indication	Bit 14 is a zero	
502.	REG SEL Indication	Bit 14 is a one	
516.	REG SEL Indication	1100 110 101 010 101	
518.	REG SEL Indication	1100 110 000 000 000	
520.	REG SEL Indication	1100 111 010 101 010	
522.	REG SEL Indication	1100 111 111 111 111	
524.	REG SEL Indication	1100 111 111 111 111	
526.	REG SEL Indication	1100 111 111 111 111	
528.	REG SEL Indication	1100 110 111 111 111	
531.	REG SEL Indication	1100 111 011 111 111	
534.	REG SEL Indication	1100 111 101 111 111	
537.	REG SEL Indication	1100 011 110 111 111	
540.	REG SEL Indication	1100 111 111 011 111	
543.	REG SEL Indication	1100 111 111 101 111	
546.	REG SEL Indication	1100 111 111 110 111	
549.	REG SEL Indication	1100 111 111 111 011	
552.	REG SEL Indication	1100 111 111 111 101	
555.	REG SEL Indication	1100 111 111 111 110	

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EQUIPMENT TEST
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JDC
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REV. B

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
563.	Frequency (XC 191)	51.200.00 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4A	
	Droop (E)	NMT 0.2A	
	Noise (F)	NMT 0.4 volts p-p	
564.	Frequency (XC 048)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4A	
	Droop (E)	NMT 0.2A	
	Noise (F)	NMT 0.4 volt p-p	
565.	Frequency (XC139)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4A	
	Droop (E)	NMT 0.2A	
	Noise (F)	NMT 0.4 volt p-p	

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EQUIPMENT TEST
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JDC
NO. 05787
REV. B

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
566.	Frequency (XC 140)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
567.	Frequency (XC 197)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
568.	Frequency (XC 149)	800.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	

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EQUIPMENT TEST
DATA SHEET 10 OF 12

JDC
NO. 05787
REV. B

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
569.	Frequency (XC 150)	800.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
570.	Frequency (XC 151)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
571.	Frequency (XC 152)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	

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APOLLO G & N
EQUIPMENT TEST 11
DATA SHEET 11 OF 12

JDC
NO. 05787
REV. B

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
572. 2	Frequency (XC 155)	12,800.00 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
573. 3	Frequency (XC 901)	25,600.00 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
574. 4	Frequency (XC 052)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	

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JDC
NO. 05787
REV. B

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
	Rise Time (C)	NMT 0.2 µ sec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	

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JOB INPUT/OUTPUT REGISTERS TEST
INITIAL TDRR 35464 D.S. PGS 12
SUBSYSTEM Computer
ASSY. Block II C-Computer

DESCRIPTION

Tests the operation of the computer input-output channels 5, 6, 12, 30, 31, 32, and 33. Procedures for checking input-output and continuous interface signals are also provided.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	3-22-68	35897	20, 23	7	EA	-
B	8-6-68	36665	15	-	EA	-
C	2-27-69	37377	23	-	EA	-

REFERENCES JDC's 05401, 05405, 05413, 05414, ND-1021042, ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface panels are set-up as specified in JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the XY and RDC Interface panels of the CTS.

3. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

4. On the RDC Interface panel, set the CHV METERS switch to the DCVM position.

OPERATION

5. Press the LOAD CHAN V 2K OHMS and LOAD CHAN V 1K OHMS annunciators on the RDC Interface panel to energize.

6. Test signals RD086 and RD087 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 301.

b. Observe the digital voltmeter indication on the Power Control panel. Record on data sheet.

c. Press the LOAD CHAN V 2K OHMS annunciator to the off position.

7. Test signals RD166 and RD861 as follows:

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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a. Set the CHANNEL V switches to position 305.

b. Observe the digital voltmeter indication. Record on data sheet.

8. Test signals RD863 and RD869 as follows:

a. Set the CHANNEL V switches to position 306.

b. Observe the digital voltmeter indication. Record on data sheet.

9. Test signals RD865 and RD904 as follows:

a. Set the CHANNEL V switches to position 307.

b. Observe the digital voltmeter indication. Record on data sheet.

10. Test signals RD866 and RD867 as follows:

a. Set the CHANNEL V switches to 308.

b. Observe the digital voltmeter indication. Record on data sheet.

11. Test signals RD868 and RD870 as follows:

a. Press the LOAD CHAN V 1K OHMS annunciator to the off position, and press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 309.

c. Observe the digital voltmeter indication. Record on data sheet.

12. Test signals RD877 and RD878 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position, and press the LOAD CHAN V 1K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 313.

c. Observe the digital voltmeter indication. Record on data sheet.

13. Test signal RD091 as follows:

a. Press the LOAD CHAN V 1K OHMS annunciator to the off position, and press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 302.

c. Observe the digital voltmeter indication. Record on data sheet.

14. Test signal RD101 as follows:

a. Set the CHANNEL V switches to position 303.

b. Observe the digital voltmeter indication. Record on data sheet.

15. Test signal RD907 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position, and press the LOAD CHAN V 1K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 310.

c. Observe the digital voltmeter indication. Record on data sheet.

16. Test signal RD874 as follows:

a. Set the CHANNEL V switches to position 311.

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b. Observe the digital voltmeter indication. Record on data sheet.

17. Test signal RD876 as follows:

a. Press the LOAD CHAN V 1K OHMS annunciator to the off position and press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 312.

c. Observe the digital voltmeter indication. Record on data sheet.

18. Test signal RD879 as follows:

a. Set the CHANNEL V switches to position 314.

b. Observe the digital voltmeter indication. Record on data sheet.

19. Test signal RD251 as follows:

a. Set the CHANNEL V switches to position 319.

b. Observe the digital voltmeter indication (0 vdc). Record on data sheet.

20. Test signal RD903 as follows:

a. Set the CHANNEL V switches to position 401.

b. Observe the digital voltmeter indication. Record on data sheet.

21. Test signal RD175 as follows:

a. Set the CHANNEL V switches to position 402.

b. Observe the digital voltmeter indication (2 vdc). Record on data sheet.

22. Test signal RD176 as follows:

a. Set the CHANNEL V switches to position 403.

b. Observe the digital voltmeter indication (7.0 vdc). Record on data sheet.

23. Test signal RD177 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position and press the LOAD CHAN V 1K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 411.

c. Observe the digital voltmeter indication (2 vdc.) Record on data sheet.

24. Press LOAD CHAN V 1K OHMS to de-energize.

25. Set the CHANNEL V switches to position 101.

CHANNEL 5 CHECK

26. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00125.

27. Verify that the RZ display is 0000 000 000 000 101.

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28. Verify that the REG SEL display is 0000 000 001 010 101.

29. Press the CHANNEL button.

30. Press the EXECUTE button.

31. Verify that the LINC indicator is on.

32. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

33. Verify that the RZ display is 0000 000 000 000 101.

34. Press the CHANNEL button.

35. Press the EXECUTE button.

36. Verify that the OINC indicator is on.

37. Verify that the REG SEL display is 0000 000 001 010 101. Stamp data sheet.

38. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00252.

39. Verify that the RZ display is 0000 000 000 000 101.

40. Verify that the REG SEL display is 0000 000 010 101 010.

41. Press the CHANNEL button.

42. Press the EXECUTE button.

43. Verify that the LINC indicator is on.

44. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

45. Verify that the RZ display is 0000 000 000 000 101.

46. Press the CHANNEL button.

47. Press the EXECUTE button.

48. Verify that the OINC indicator is on.

49. Verify that the REG SEL display is 0000 000 010 101 010. Stamp data sheet.

50. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00000.

51. Verify that the RZ display is 0000 000 000 000 101.

52. Verify that the REG SEL display is 0000 000 000 000 000.

53. Press the CHANNEL button.

54. Press the EXECUTE button.

55. Verify that the LINC indicator is on.

56. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

57. Verify that the RZ display is 0000 000 000 000 101.

58. Press the CHANNEL button.

59. Press the EXECUTE button.

60. Verify that the OINC indicator is on.

61. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

62. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00377.

63. Verify that the RZ display is 0000 000 000 000 101.

64. Verify that the REG SEL display is 0000 000 011 111 111.

65. Press the CHANNEL button.

66. Press the EXECUTE button.

67. Verify that the LINC indicator is on.

68. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

69. Verify that the RZ display is 0000 000 000 000 101.

70. Press the CHANNEL button.

71. Press the EXECUTE button.

72. Verify that the OINC indicator is on.

73. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

74. Press FRESH START.

75. Press the READ-AGC pushbutton.

a. Press the CL Key.

b. Press Keys 0005.

76. Verify that the RZ display is 0000 000 000 000 101.

77. Press the CHANNEL button.

78. Press the EXECUTE button.

79. Verify that the OINC indicator is on.

80. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

DC OUTPUT TEST

81. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00377.

82. Verify that the RZ display is 0000 000 000 000 101.

83. Verify that the REG SEL display is 0000 000 011 111 111.

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84. Press the CHANNEL button.

85. Press the EXECUTE button.

86. Verify that the LINC indicator is on.

87. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

88. Verify that the RZ display is 0000 000 000 000 101.

89. Press the CHANNEL button.

90. Press the EXECUTE button.

91. Verify that the OINC indicator is on.

92. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

93. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

94. Set the CHV METERS switch on the RDC Interface panel to the DCVM position.

95. Depress the LOAD CHAN V 1K OHMS annunciator on the RDC Interface panel to energize.

96. Test signal CB801 as follows:

a. Set the CHANNEL V switch on the RDC Interface panel to position 601.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

97. Test signal CB806 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 602.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

98. Test signal CB805 as follows:

a. Set the CHANNEL V switches to position 603.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

99. Test signal CB802 as follows:

a. Set the CHANNEL V switches to position 604.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

100. Test signal CB803 as follows:

a. Set the CHANNEL V switches to position 605.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

101. Test signal CB808 as follows:

a. Set the CHANNEL V switches to position 606.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

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102. Test signal CB807 as follows:

a. Set the CHANNEL V switches to position 607.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

103. Test signal CB804 as follows:

a. Set the CHANNEL V switches to position 608.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

104. Set the CHV METERS switch to the OFF position.

105. Press LOAD CHAN V 1K OHMS to de-energize.

106. Set the CHANNEL V switches to position 101.

CHANNEL 6 CHECK

107. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00125.

108. Verify that the RZ display is 0000 000 000 000 110.

109. Verify that the REG SEL display is 0000 000 001 010 101.

110. Press the CHANNEL button.

111. Press the EXECUTE button.

112. Verify that the LINC indicator is on.

113. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

114. Verify that the RZ display is 0000 000 000 000 110.

115. Press the CHANNEL button.

116. Press the EXECUTE button.

117. Verify that the OINC indicator is on.

118. Verify that the REG SEL display is 0000 000 001 010 101. Stamp data sheet.

119. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00252.

120. Verify that the RZ display is 0000 000 000 000 110.

121. Verify that the REG SEL display is 0000 000 010 101 010.

122. Press the CHANNEL button.

123. Press the EXECUTE button.

124. Verify that the LINC indicator is on.

125. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

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b. Press Keys 0006.

126. Verify that the RZ display is 0000 000 000 000 110.

127. Press the CHANNEL button.

128. Press the EXECUTE button.

129. Verify that the OINC indicator is on.

130. Verify that the REG SEL display is 0000 000 010 101 010. Stamp data sheet.

131. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00000.

132. Verify that the RZ display is 0000 000 000 000 110.

133. Verify that the REG SEL display is 0000 000 000 000 000.

134. Press the CHANNEL button.

135. Press the EXECUTE button.

136. Verify that the LINC indicator is on.

137. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

138. Verify that the RZ display is 0000 000 000 000 110.

139. Press the CHANNEL button.

140. Press the EXECUTE button.

141. Verify that the OINC indicator is on.

142. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

143. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00377.

144. Verify that the RZ display is 0000 000 000 000 110.

145. Verify that the REG SEL display is 0000 000 011 111 111.

146. Press the CHANNEL button.

147. Press the EXECUTE button.

148. Verify that the LINC indicator is on.

149. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

150. Verify that the RZ display is 0000 000 000 000 110.

151. Press the CHANNEL button.

152. Press the EXECUTE button.

153. Verify that the OINC indicator is on.

154. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

155. Press FRESH START.

156. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

157. Verify that the RZ display is 0000 000 000 000 110.

158. Press the CHANNEL button.

159. Press the EXECUTE button.

160. Verify that the OINC indicator is on.

161. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

DC OUTPUT TEST

162. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00377.

163. Verify that the RZ display is 0000 000 000 000 110.

164. Verify that the REG SEL display is 0000 000 011 111 111.

165. Press the CHANNEL button.

166. Press the EXECUTE button.

167. Verify that the LINC indicator is on.

168. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

169. Verify that the RZ display is 0000 000 000 000 110.

170. Press the CHANNEL button.

171. Press the EXECUTE button.

172. Verify that the OINC indicator is on.

173. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

174. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

175. Set the CHV METERS switch on the RDC Interface panel to the DCVM position.

176. Press the LOAD CHAN V 1K OHMS annunciator on the RDC Interface panel to energize.

177. Test signal CB813 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 609.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

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178. Test signal CB816 as follows:

a. Set the CHANNEL V switches to position 610.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

179. Test signal CB815 as follows:

a. Set the CHANNEL V switches to position 611.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

180. Test signal CB814 as follows:

a. Set the CHANNEL V switches to position 612.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

181. Test signal CB809 as follows:

a. Set the CHANNEL V switches to position 613.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

182. Test signal CB812 as follows:

a. Set the CHANNEL V switches to position 614.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

183. Test signal CB811 as follows:

a. Set the CHANNEL V switches to position 615.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

184. Test signal CB810 as follows:

a. Set the CHANNEL V switches to position 616.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

185. Set the CHV METERS switch to the OFF position.

186. Press LOAD CHAN V 1K OHMS to de-energize.

187. Set the CHANNEL V switches to position 101.

188. Press the KEYBOARD LOAD pushbutton indicator.

189. Press the CL Key.

190. Press Keys 00012.

191. Press Keys 52525.

192. Verify that the RZ display is 0000 000 000 001 010.

193. Verify that the REG SEL display is 0101 010 101 010 101.

194. Press the CHANNEL button.

195. Press the EXECUTE button.

196. Verify that the LINC indicator is on.

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197. Press the READ-AGC pushbutton indicator.

198. Press the CL Key.

199. Press Keys 0012.

200. Verify that the RZ display is 0000 000 000 001 010.

201. Press the CHANNEL button.

202. Press the EXECUTE button.

203. Verify that the OINC indicator is on.

204. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

205. Press the KEYBOARD LOAD pushbutton indicator.

206. Press the CL Key.

207. Press Keys 00012.

208. Press Keys 25252.

209. Verify that the RZ display is 0000 000 000 001 010.

210. Verify that the REG SEL display is 0010 101 010 101 010.

211. Press the CHANNEL button.

212. Press the EXECUTE button.

213. Verify that the LINC indicator is on.

214. Press the READ-AGC pushbutton indicator.

215. Press the CL Key.

216. Press Keys 0012.

217. Verify that the RZ display is 0000 000 000 001 010.

218. Press the CHANNEL button.

219. Press the EXECUTE button.

220. Verify that the OINC indicator is on.

221. Verify that the REG SEL display is 0010 101 010 101 010. Stamp data sheet.

222. Press the KEYBOARD LOAD pushbutton indicator.

223. Press the CL Key.

224. Press Keys 00012.

225. Press Keys 00000.

226. Verify that the RZ display is 0000 000 000 001 010.

227. Verify that the REG SEL display is 0000 000 000 000 000.

228. Press the CHANNEL button.

229. Press the EXECUTE button.

230. Verify that the LINC indicator is on.

231. Press the READ-AGC pushbutton indicator.

232. Press the CL Key.

233. Press Keys 0012.

234. Verify that the RZ display is 0000 000 000 001 010.

235. Press the CHANNEL button.

236. Press the EXECUTE button.

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237. Verify that the OINC indicator is on.

238. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

239. Press the KEYBOARD LOAD pushbutton indicator.

240. Press the CL Key.

241. Press Keys 00012.

242. Press Keys 77777.

243. Verify that the RZ display is 0000 000 000 001 010.

244. Verify that the REG SEL display is 0111 111 111 111 111.

245. Press the CHANNEL button.

246. Press the EXECUTE button.

247. Verify that the LINC indicator is on.

248. Press the READ-AGC pushbutton indicator.

249. Press the CL Key.

250. Press Keys 0012.

251. Verify that the RZ display is 0000 000 000 001 010.

252. Press the CHANNEL button.

253. Press the EXECUTE button.

254. Verify that the OINC indicator is on.

255. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

256. Press FRESH START.

257. Press the CL Key.

258. Press Keys 0012.

259. Verify that the RZ display is 0000 000 000 001 010.

260. Press the CHANNEL button.

261. Press the EXECUTE button.

262. Verify that the OINC indicator is on.

263. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

264. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

265. On the RDC Interface panel:

a. Set the CHV METERS switch to the DCVM position.

b. Depress the LOAD CHAN V 1K OHMS annunciator to energize.

266. Depress the LOAD CHAN V 2K OHMS annunciator to energize.

267. Test signal CB013 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 520.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

268. Press the KEYBOARD LOAD pushbutton indicator.

269. Press the CL Key.

270. Press Keys 00012.

271. Press Keys 77777.

272. Verify that the RZ display is 0000 000 000 001 010.

273. Verify that the REG SEL display is 0111 111 111 111 111.

274. Press the CHANNEL button.

275. Press the EXECUTE button.

276. Verify that the LINC indicator is on.

277. Verify that the M34 indicator (CB233) on the XY Interface panel is on. Stamp data sheet.

278. Verify that the M36 indicator (CB234) on the XY Interface panel is on. Stamp data sheet.

279. Test signal CB909 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position.

b. Set the CHANNEL V switches to position 405.

c. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

280. Test signal CB160 as follows:

a. Set the CHANNEL V switches to position 406.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

281. Test signal CB906 as follows:

a. Set the CHANNEL V switch to position 501.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

282. Test signal CB185 as follows:

a. Set the CHANNEL V switches to position 502.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

283. Test signal CB186 as follows:

a. Set the CHANNEL V switches to position 503.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

284. Test signal CB902 as follows:

a. Set the CHANNEL V switches to position 504.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

285. Test signal CB162. as follows:

a. Set the CHANNEL V switches to position 505.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

286. Test signal CB011 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the on position.

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b. Set the CHANNEL V switches to position 506.

c. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

287. Test signal CB161 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position.

b. Set the CHANNEL V switches to position 507.

c. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

288. Test signal CB194 as follows:

a. Set the CHANNEL V switches to position 508.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

289. Test signal CB195 as follows:

a. Set the CHANNEL V switches to position 509.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

290. Test signal CB196 as follows:

a. Set the CHANNEL V switches to position 510.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

291. Test signal CB841 as follows:

a. Set the CHANNEL V switches to position 617.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

292. Set the CHV METERS switch to the OFF position.

293. Press LOAD CHAN V 1K OHMS to de-energize.

CHANNEL 30 CHECK

294. Press the READ-AGC indicator switch to the on (illuminated) position.

295. Press Keys CL, 0030.

296. Verify that the RZ display is 0000 000 000 011 000.

297. Press the CHANNEL button.

298. Press the EXECUTE button.

299. Verify that the OINC indicator is on.

300. Press the FORCED READ indicator switch to the on (illuminated) position.

301. Set the T12 COUNTER STOP switch to the OFF position.

302. Press the PROCEED button.

303. Verify that the OINC indicator is on.

304. Verify that the STPIT indicator is off.

NOTE: The annunciators listed in this procedure are indicator switches, which are alternately depressed to energize (illuminated) and alternately depressed to de-energize (extinguished).

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305. Energize the following annunciators:

a. CH30-14/IN0-14

b. CH30-12/IN0-12

c. CH30-10/IN0-10

d. CH30-8/IN0-8

e. CH30-6/IN0-6

f. CH30-4/IN0-4

g. CH30-2/IN0-2

306. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

307. Energize the following annunciators:

a. CH30-15/IN0-15

b. CH30-13/IN0-13

c. CH30-11/IN0-11

d. CH30-9/IN0-9

e. CH30-7/IN0-7

f. CH30-5/IN0-5

g. CH30-3/IN0-3

h. CH30-1/IN0-1

308. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

309. De-energize the following annunciators:

a. CH30-14/IN0-14

b. CH30-12/IN0-12

c. CH30-10/IN0-10

d. CH30-8/IN0-8

e. CH30-6/IN0-6

f. CH30-4/IN0-4

g. CH30-2/IN0-2

310. Verify that the REG SEL display is 0010 101 010 101 010. Stamp data sheet

311. De-energize the following annunciators:

a. CH30-15/IN0-15

b. CH30-13/IN0-13

c. CH30-11/IN0-11

d. CH30-9/IN0-9

e. CH30-7/IN0-7

f. CH30-5/IN0-5

g. CH30-3/IN0-3

h. CH30-1/IN0-1

312. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

High Zero Test

313. Set the DE MARGINS switch to the V0 position.

314. Energize the CH30-15/IN0-15 through CH30-1/IN0-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

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315. De-energize the CH30-15/IN0-15 through CH30-1/IN0-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

316. Set the DE MARGINS switch to the V1 position.

317. Energize the CH30-15/IN0-15 annunciator.

318. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

319. De-energize the CH30-15/IN0-15 annunciator.

320. Energize the CH30-14/IN0-14 annunciator.

321. Verify that the REG SEL display is 1101 111 111 111 111. Stamp data sheet.

322. De-energize the CH30-14/IN0-14 annunciator.

323. Energize the CH30-13/IN0-13 annunciator.

324. Verify that the REG SEL display is 1110 111 111 111 111. Stamp data sheet.

325. De-energize the CH30-13/IN0-13 annunciator.

326. Energize the CH30-12/IN0-12 annunciator.

327. Verify that the REG SEL display is 1111 011 111 111 111. Stamp data sheet,

328. De-energize the CH30-12/IN0-12 annunciator.

329. Energize the CH30-11/IN0-11 annunciator.

330. Verify that the REG SEL display is 1111 101 111 111 111. Stamp data sheet.

331. De-energize the CH30-11/IN0-11 annunciator.

332. Energize the CH30-10/IN0-10 annunciator.

333. Verify that the REG SEL display is 1111 110 111 111 111. Stamp data sheet.

334. De-energize the CH30-10/IN0-10 annunciator.

335. Energize the CH30-9/IN0-9 annunciator.

336. Verify that the REG SEL display is 1111 111 011 111 111. Stamp data sheet.

337. De-energize the CH30-9/IN0-9 annunciator.

338. Energize the CH30-8/IN0-8 annunciator.

339. Verify that the REG SEL display is 1111 111 101 111 111. Stamp data sheet.

340. De-energize the CH30-8/IN0-8 annunciator.

341. Energize the CH30-7/IN0-7 annunciator.

342. Verify that the REG SEL display is 1111 111 110 111 111. Stamp data sheet.

343. De-energize the CH30-7/IN0-7 annunciator.

344. Energize the CH30-6/IN0-6 annunciator.

345. Verify that the REG SEL display is 1111 111 111 011 111. Stamp data sheet.

346. De-energize the CH30-6/IN0-6 annunciator.

347. Energize the CH30-5/IN0-5 annunciator.

348. Verify that the REG SEL display is 1111 111 111 101 111. Stamp data sheet.

349. De-energize the CH-5/IN0-5 annunciator.

350. Energize the CH30-4/IN0-4 annunciator.

351. Verify that the REG SEL display is 1111 111 111 110 111. Stamp data sheet.

352. De-energize the CH30-4/IN0-4 annunciator.

353. Energize the CH30-3/IN0-3 annunciator.

354. Verify that the REG SEL display is 1111 111 111 111 011. Stamp data sheet.

355. De-energize the CH30-3/IN0-3 annunciator.

356. Energize the CH30-2/IN0-2 annunciator.

357. Verify that the REG SEL display is 1111 111 111 111 101. Stamp data sheet.

358. De-energize the CH30-2/IN0-2 annunciator.

359. Energize the CH30-1/IN0-1 annunciator.

360. Verify that the REG SEL display is 1111 111 111 111 110. Stamp data sheet.

361. De-energize the CH30-1/IN0-1 annunciator.

362. Set the DE MARGINS switch to the NORM position.

363. Set the T12 COUNTER STOP switch to the ON position.

364. De-energize the FORCED READ annunciator.

CHANNEL 31 CHECK

365. Press Keys CL, 0031.

366. Verify that the RZ display is 0000 000 000 011 001.

367. Press the CHANNEL button.

368. Press the EXECUTE button.

369. Verify that the OINC indicator is on.

370. Press the FORCED READ indicator switch to the on (illuminated) position.

371. Set the T12 COUNTER STOP switch to the OFF position.

372. Press the PROCEED button.

373. Verify that the OINC indicator is on.

374. Verify that the STPIT indicator is off.

375. Energize the following annunciators:

- a. CH31-14/IN2-14
- b. CH31-12/IN2-12
- c. CH31-10/IN2-10
- d. CH31-8/IN2-8
- e. CH31-6/IN2-6
- f. CH31-4/IN2-4

- g. CH31-2/IN2-2

376. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

377. Energize the following annunciators:

- a. CH31-15/IN2-15
- b. CH31-13/IN2-13
- c. CH31-11/IN2-11
- d. CH31-9/IN2-9
- e. CH31-7/IN2-7
- f. CH31-5/IN2-5
- g. CH31-3/IN2-3
- h. CH31-1/IN2-1

378. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

379. De-energize the following annunciators:

- a. CH31-14/IN2-14
- b. CH31-12/IN2-12
- c. CH31-10/IN2-10
- d. CH31-8/IN2-8
- e. CH31-6/IN2-6
- f. CH31-4/IN2-4
- g. CH31-2/IN2-2

380. Verify that the REG SEL display is 0010 101 010 101 010. Stamp data sheet.

381. De-energize the following annunciators:

- a. CH31-15/IN2-15
- b. CH31-13/IN2-13
- c. CH31-11/IN2-11
- d. CH31-9/IN2-9
- e. CH31-7/IN2-7
- f. CH31-5/IN2-5
- g. CH31-3/IN2-3
- h. CH31-1/IN2-1

382. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

High Zero Test

383. Set the DE MARGINS switch to the V0 position.

384. Energize the CH31-15/IN2-15 through CH31-1/IN2-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

385. De-energize the CH31-15/IN2-15 through CH31-1/IN2-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

386. Set the DE MARGINS switch to the V1 position.

387. Energize the CH31-15/IN2-15 annunciator.

388. Verify that the REG SEL display is 0011 111 111 111 111. Stamp data sheet.

389. De-energize the CH31-15/IN2-15 annunciator.

390. Energize the CH31-14/IN2-14 annunciator.

391. Verify that the REG SEL display is 1101 111 111 111 111. Stamp data sheet.

392. De-energize the CH31-14/IN2-14 annunciator.

393. Energize the CH31-13/IN2-13 annunciator.

394. Verify that the REG SEL display is 1110 111 111 111 111. Stamp data sheet.

395. De-energize the CH31-13/IN2-13 annunciator.

396. Energize the CH31-12/IN2-12 annunciator.

397. Verify that the REG SEL display is 1111 011 111 111 111. Stamp data sheet.

398. De-energize the CH31-12/IN2-12 annunciator.

399. Energize the CH31-11/IN2-11 annunciator.

400. Verify that the REG SEL display is 1111 101 111 111 111. Stamp data sheet.

401. De-energize the CH31-11/IN2-11 annunciator.

402. Energize the CH31-10/IN2-10 annunciator.

403. Verify that the REG SEL display is 1111 110 111 111 111. Stamp data sheet.

404. De-energize the CH31-10/IN2-10 annunciator.

405. Energize the CH31-9/IN2-9 annunciator.

406. Verify that the REG SEL display is 1111 111 011 111 111. Stamp data sheet.

407. De-energize the CH31-9/IN2-9 annunciator.

408. Energize the CH31-8/IN2-8 annunciator.

409. Verify that the REG SEL display is 1111 111 101 111 111. Stamp data sheet.

410. De-energize the CH31-8/IN2-8 annunciator.

411. Energize the CH31-7/IN2-7 annunciator.

412. Verify that the REG SEL display is 1111 111 110 111 111. Stamp data sheet.

413. De-energize the CH31-7/IN2-7 annunciator.

414. Energize the CH31-6/IN2-6 annunciator.

415. Verify that the REG SEL display is 1111 111 111 011 111. Stamp data sheet.

416. De-energize the CH31-6/IN2-6 annunciator.

417. Energize the CH31-5/IN2-5 annunciator.

418. Verify that the REG SEL display is 1111 111 111 101 111. Stamp data sheet.

419. De-energize the CH31-5/IN2-5 annunciator.

420. Energize the CH31-4/IN2-4 annunciator.

421. Verify that the REG SEL display is 1111 111 111 110 111. Stamp data sheet.

422. De-energize the CH31-4/IN2-4 annunciator.

423. Energize the CH31-3/IN2-3 annunciator.

424. Verify that the REG SEL display is 1111 111 111 111 011. Stamp data sheet.

425. De-energize the CH31-3/IN2-3 annunciator.

426. Energize the CH31-2/IN2-2 annunciator.

427. Verify that the REG SEL display is 1111 111 111 111 101. Stamp data sheet.

428. De-energize the CH31-2/IN2-2 annunciator.

429. Energize the CH31-1/IN2-1 annunciator.

430. Verify that the REG SEL display is 1111 111 111 111 110. Stamp data sheet.

431. De-energize the CH31-1/IN2-1 annunciator.

432. Set the DE MARGINS switch to the NORM position.

433. Set the T12 COUNTER STOP switch to the ON position.

434. De-energize the FORCED READ annunciator.

CHANNEL 32 CHECK

> NOTE: If ECP 518 has been incorporated, CH32-14/IN3-14 will be functional as detailed in the steps specifying the state of the REG SEL display.

435. Press Keys CL, 0032.

436. Verify that the RZ display is 0000 000 000 011 010.

437. Press the CHANNEL button.

438. Press the EXECUTE button.

439. Verify that the OINC indicator is on.

440. Press the FORCED READ indicator switch to the on (illuminated) position.

441. Set the T12 COUNTER STOP switch to the OFF position.

442. Press the PROCEED button.

443. Verify that the OINC indicator is on.

444. Verify that the STPIT indicator is off.

445. Energize the following annunciators:

- a. CH32-14/IN3-14
- b. CH32-12/IN3-12
- c. CH32-10/IN3-10
- d. CH32-8/IN3-8
- e. CH32-6/IN3-6
- f. CH32-4/IN3-4

g. CH32-2/IN3-2

446. Verify that the REG SEL display is 1101 110 101 010 101. (Without ECP 518, 1111 110 101 010 101). Stamp data sheet.

447. Energize the following annunciators:

a. CH32-15/IN3-15

b. CH32-13/IN3-13

c. CH32-11/IN3-11

d. CH32-9/IN3-9

e. CH32-7/IN3-7

f. CH32-5/IN3-5

g. CH32-3/IN3-3

h. CH32-1/IN3-1

448. Verify that the REG SEL display is 1101 100 000 000 000. (Without ECP 518, 1111 100 000 000 000). Stamp data sheet.

449. De-energize the following annunciators:

a. CH32-14/IN3-14

b. CH32-12/IN3-12

c. CH32-10/IN3-10

d. CH32-8/IN3-8

e. CH32-6/IN3-6

f. CH32-4/IN3-4

g. CH32-2/IN3-2

450. Verify that the REG SEL display is 1111 101 010 101 010. Stamp data sheet.

451. De-energize the following annunciators:

a. CH32-15/IN3-15

b. CH32-13/IN3-13

c. CH32-11/IN3-11

d. CH32-9/IN3-9

e. CH32-7/IN3-7

f. CH32-5/IN3-5

g. CH32-3/IN3-3

h. CH32-1/IN3-1

452. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

High Zero Test

453. Set the DE MARGINS switch to the V0 position.

454. Energize the CH32-15/IN3-15 through CH32-1/IN3-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

455. De-energize the CH32-15/IN3-15 through CH32-1/IN3-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

456. Set the DE MARGINS switch to the V1 position.

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457. Energize the CH32-15/IN3-15 annunciator.

458. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

459. De-energize the CH32-15/IN3-15 annunciator.

460. Energize the CH32-14/IN3-14 annunciator.

461. Verify that the REG SEL display is 1101 111 111 111 111. (Without ECP 518, 1111 111 111 111 111). Stamp data sheet.

462. De-energize the CH32-14/IN3-14 annunciator.

463. Energize the CH32-13/IN3-13 annunciator.

464. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

465. De-energize the CH32-13/IN3-13 annunciator.

466. Energize the CH32-12/IN3-12 annunciator.

467. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

468. De-energize the CH32-12/IN3-12 annunciator.

469. Energize the CH32-11/IN3-11 annunciator.

470. Verify that the REG SEL display is 1111 101 111 111 111. Stamp data sheet.

471. De-energize the CH32-11/IN3-11 annunciator.

472. Energize the CH32-10/IN3-10 annunciator.

473. Verify that the REG SEL display is 1111 110 111 111 111. Stamp data sheet.

474. De-energize the CH32-10/IN3-10 annunciator.

475. Energize the CH32-9/IN3-9 annunciator.

476. Verify that the REG SEL display is 1111 111 011 111 111. Stamp data sheet.

477. De-energize the CH32-9/IN3-9 annunciator.

478. Energize the CH32-8/IN3-8 annunciator.

479. Verify that the REG SEL display is 1111 111 101 111 111. Stamp data sheet.

480. De-energize the CH32-8/IN3-8 annunciator.

481. Energize the CH32-7/IN3-7 annunciator.

482. Verify that the REG SEL display is 1111 111 110 111 111. Stamp data sheet.

483. De-energize the CH32-7/IN3-7 annunciator.

484. Energize the CH32-6/IN3-6 annunciator.

485. Verify that the REG SEL display is 1111 111 111 011 111. Stamp data sheet.

486. De-energize the CH32-6/IN3-6 annunciator.

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487. Energize the CH32-5/IN3-5 annunciator.

488. Verify that the REG SEL display is 1111 111 111 101 111. Stamp data sheet.

489. De-energize the CH32-5/IN3-5 annunciator.

490. Energize the CH32-4/IN3-4 annunciator.

491. Verify that the REG SEL display is 1111 111 111 110 111. Stamp data sheet.

492. De-energize the CH32-4/IN3-4 annunciator.

493. Energize the CH32-3/IN3-3 annunciator.

494. Verify that the REG SEL display is 1111 111 111 111 011. Stamp data sheet.

495. De-energize the CH32-3/IN3-3 annunciator.

496. Energize the CH32-2/IN3-2 annunciator.

497. Verify that the REG SEL display is 1111 111 111 111 101. Stamp data sheet.

498. De-energize the CH32-2/IN3-2 annunciator.

499. Energize the CH32-1/IN3-1 annunciator.

500. Verify that the REG SEL display is 1111 111 111 111 110. Stamp data sheet. De-energize the CH32-1/IN3-1 annunciator and set the DE MARGINS switch to the NORMAL position.

NOTE: If ECP 518 has not been incorporated, do not perform steps 501 and 502.

501. Depress the DSKY PRO (STBY) pushbutton, and hold depressed just long enough to verify that bit 14 of the REG SEL display is a zero (1101 111 111 111 111). Stamp data sheet.

502. Verify that bit 14 of the REG SEL display switched back to a one (1111 111 111 111 111) when the DSKY PRO (STBY) pushbutton was released. Stamp data sheet.

503. Set the T12 COUNTER STOP switch to the ON position.

504. De-energize the FORCED READ annunciator.

CHANNEL 33 CHECK

504a. Press KYBD LOAD.

504b. Press Keys CL, 00033, 00000.

504c. Verify that RZ display is 0000 000 000 011 011

504d. Verify that REG SEL display is 0000 000 000 000 000

504e. Press CHANNEL pushbutton.

504f. Press EXECUTE pushbutton.

504g. Press READ AGC to ON.

505. Press Keys CL, 0033.

506. Verify that the RZ display is 0000 000 000 011 011.

507. Press the CHANNEL button.

508. Press the EXECUTE button.

509. Verify that the OINC indicator is on.

510. Press the FORCED READ indicator switch to the on (illuminated) position.

511. Set the T12 COUNTER STOP switch to the OFF position.

512. Press the PROCEED button.

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513. Verify that the OINC indicator is on.

514. Verify that the STPIT indicator is off.

515. Energize the following annunciators:

a. CH33-10

b. CH33-8

c. CH33-6

d. CH33-4

e. CH33-2

516. Verify that the REG SEL display is 1100 110 101 010 101. Stamp data sheet.

517. Energize the following annunciators:

a. CH33-9

b. CH33-7

c. CH33-5

d. CH33-3

e. CH33-1

518. Verify that the REG SEL display is 1100 110 000 000 000. Stamp data sheet.

519. De-energize the following annunciators:

a. CH33-10

b. CH33-8

c. CH33-6

d. CH33-4

e. CH33-2

520. Verify that the REG SEL display is 1100 111 010 101 010. Stamp data sheet.

521. De-energize the following annunciators:

a. CH33-9

b. CH33-7

c. CH33-5

d. CH33-3

e. CH33-1

522. Verify that the REG SEL display is 1100 111 111 111 111. Stamp data sheet.

High Zero Test

523. Set the DE MARGINS switch to the V0 position.

524. Energize the CH33-10 through CH33-1 annunciators and verify that the REG SEL display remains 1100 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

525. De-energize the CH33-10 through CH33-1 annunciators and verify that the REG SEL display remains 1100 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

526. Set the DE MARGINS switch to the V1 position.

527. Energize the CH33-10 annunciator.

528. Verify that the REG SEL display is 1100 110 111 111 111. Stamp data sheet.

529. De-energize the CH33-10 annunciator.

530. Energize the CH33-9 annunciator.

531. Verify that the REG SEL display is 1100 111 011 111 111. Stamp data sheet.

532. De-energize the CH33-9 annunciator.

533. Energize the CH33-8 annunciator.

534. Verify that the REG SEL display is 1100 111 101 111 111. Stamp data sheet.

535. De-energize the CH33-8 annunciator.

536. Energize the CH33-7 annunciator.

537. Verify that the REG SEL display is 1100 111 110 111 111. Stamp data sheet.

538. De-energize the CH33-7 annunciator.

539. Energize the CH33-6 annunciator.

540. Verify that the REG SEL display is 1100 111 111 011 111. Stamp data sheet.

541. De-energize the CH33-6 annunciator.

542. Energize the CH33-5 annunciator.

543. Verify that the REG SEL display is 1100 111 111 101 111. Stamp data sheet.

544. De-energize the CH33-5 annunciator.

545. Energize the CH33-4 annunciator.

546. Verify that the REG SEL display is 1100 111 111 110 111. Stamp data sheet.

547. De-energize the CH33-4 annunciator.

548. Energize the CH33-3 annunciator.

549. Verify that the REG SEL display is 1100 111 111 111 011. Stamp data sheet.

550. De-energize the CH33-3 annunciator.

551. Energize the CH33-2 annunciator.

552. Verify that the REG SEL display is 1100 111 111 111 101. Stamp data sheet.

553. De-energize the CH33-2 annunciator.

554. Energize the CH33-1 annunciator.

555. Verify that the REG SEL display is 1100 111 111 111 110. Stamp data sheet.

556. De-energize the CH33-1 annunciator.

557. Set the DE MARGINS switch to the NORM position.

558. Set the T12 COUNTER STOP switch to the ON position.

559. De-energize the FORCED READ annunciator.

CONTINUOUS SIGNALS CHECK

560. Perform the preparation section of Frequency Measurement, JDC 05401.

561. Perform the preparation section of Pulse Measurement, JDC 05405.

562. On the XY Interface panel:

a. Set the SCOPE switch to the DIFF S position.

b. Press LOAD CHAN S 510 OHMS to energize.

563. Test signal XC 191 as follows:

a. Set the CHANNEL S switches to the 104 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

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c. Measure the frequency (51,200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

564. Test signal XC048 as follows:

a. Set the CHANNEL S switches to the 105 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the Frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

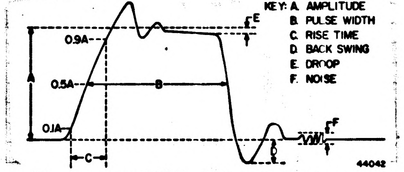

Figure 1

565. Test signal XC139 as follows:

a. Set the CHANNEL S switches to the 107 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

566. Test signal XC140 as follows:

a. Set the CHANNEL S switches to the 108 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

567. Test signal XC197 as follows:

a. Set the CHANNEL S switches to the 109 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

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e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

568. Test signal XC149 as follows:

a. Set the CHANNEL S switches on the XY Interface panel to the 110 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (800 cps) displayed on Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

569. Test signal XC150 as follows:

a. Set the CHANNEL S switches to the 111 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (800 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

570. Test signal XC151 as follows:

a. Set the CHANNEL S switches to the 112 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

571. Test signal XC152 as follows:

a. Set the CHANNEL S switches to the 113 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

572. Test signal XC155 as follows:

a. Set the CHANNEL S switches to the 116 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (12.8 kpps) displayed on the Frequency Counter. Record on data sheet.

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d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

573. Test signal XC901 as follows:

a. Set the CHANNEL S switches to the 117 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (25.6 kpps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

574. Test signal XC052 as follows:

a. Set the CHANNEL S switches to the 118 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

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EQUIPMENT TEST
DATA SHEET 1 OF 12

JDC
NO. 05787
REV. C
INITIAL TDRR 35464

JOB INPUT/OUTPUT REGISTERS TEST

ASSEMBLY UNDER TEST
TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY
DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION
APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
6.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
7.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
8.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
9.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
10.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
11.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
12.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
13.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
14.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
15.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
16.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
17.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
18.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
19.	Digital Voltmeter Indication	0.0 (± 1.0) vdc	
20.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	

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EQUIPMENT TEST
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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
21.	Digital Voltmeter Indication	2.0 (± 0.6) vdc	
22.	Digital Voltmeter Indication	7.0 (± 0.25) vdc	
23.	Digital Voltmeter Indication	2.0 (± 0.6) vdc	
37.	REG SEL Indication	0000 000 001 010 101	
49.	REG SEL Indication	0000 000 010 101 010	
61.	REG SEL Indication	0000 000 000 000 000	
73.	REG SEL Indication	0000 000 011 111 111	
80.	REG SEL Indication	0000 000 000 000 000	
92.	REG SEL Indication	0000 000 011 111 111	
96.	Digital Voltmeter Indication	2.5 vdc	
97.	Digital Voltmeter Indication	2.5 vdc	
98.	Digital Voltmeter Indication	2.5 vdc	
99.	Digital Voltmeter Indication	2.5 vdc	
100.	Digital Voltmeter Indication	2.5 vdc	
101.	Digital Voltmeter Indication	2.5 vdc	
102.	Digital Voltmeter Indication	2.5 vdc	
103.	Digital Voltmeter Indication	2.5 vdc	
118.	REG SEL Indication	0000 000 001 010 101	
130.	REG SEL Indication	0000 000 010 101 010	
142.	REG SEL Indication	0000 000 000 000 000	
154.	REG SEL Indication	0000 000 011 111 111	
161.	REG SEL Indication	0000 000 000 000 000	

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DATA SHEET 3 OF 12

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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
173.	REG SEL Indication	0000 000 011 111 111	
177.	Digital Voltmeter Indication	2.5 vdc	
178.	Digital Voltmeter Indication	2.5 vdc	
179.	Digital Voltmeter Indication	2.5 vdc	
180.	Digital Voltmeter Indication	2.5 vdc	
181.	Digital Voltmeter Indication	2.5 vdc	
182.	Digital Voltmeter Indication	2.5 vdc	
183.	Digital Voltmeter Indication	2.5 vdc	
184.	Digital Voltmeter Indication	2.5 vdc	
204.	REG SEL Indication	1101 010 101 010 101	
221.	REG SEL Indication	0010 101 010 101 010	
238.	REG SEL Indication	0000 000 000 000 000	
255.	REG SEL Indication	1111 111 111 111 111	
263.	REG SEL Indication	0000 000 000 000 000	
267.	Digital Voltmeter Indication	2.5 vdc	
277.	Illuminated XY Indicator	M34	
278.	Illuminated XY Indicator	M36	
279c.	Digital Voltmeter Indication	2.5 vdc	
280b.	Digital Voltmeter Indication	2.5 vdc	
281b.	Digital Voltmeter Indication	2.5 vdc	
282b.	Digital Voltmeter Indication	2.5 vdc	
283b.	Digital Voltmeter Indication	2.5 vdc	

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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
284b.	Digital Voltmeter Indication	2.5 vdc	
285b.	Digital Voltmeter Indication	2.5 vdc	
286c.	Digital Voltmeter Indication	2.5 vdc	
287c.	Digital Voltmeter Indication	2.5 vdc	
288b.	Digital Voltmeter Indication	2.5 vdc	
289b.	Digital Voltmeter Indication	2.5 vdc	
290b.	Digital Voltmeter Indication	2.5 vdc	
291b.	Digital Voltmeter Indication	2.5 vdc	
306.	REG SEL Indication	1101 010 101 010 101	
308.	REG SEL Indication	0000 000 000 000 000	
310.	REG SEL Indication	0010 101 010 101 010	
312.	REG SEL Indication	1111 111 111 111 111	
314.	REG SEL Indication	1111 111 111 111 111	
315.	REG SEL Indication	1111 111 111 111 111	
318.	REG SEL Indication	0000 000 000 000 000	
321.	REG SEL Indication	1101 111 111 111 111	
324.	REG SEL Indication	1110 111 111 111 111	
327.	REG SEL Indication	1111 011 111 111 111	
330.	REG SEL Indication	1111 101 111 111 111	
333.	REG SEL Indication	1111 110 111 111 111	
336.	REG SEL Indication	1111 111 011 111 111	
339.	REG SEL Indication	1111 111 101 111 111	

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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
342.	REG SEL Indication	1111 111 110 111 111	
345.	REG SEL Indication	1111 111 111 011 111	
348.	REG SEL Indication	1111 111 111 101 111	
351.	REG SEL Indication	1111 111 111 110 111	
354.	REG SEL Indication	1111 111 111 111 011	
357.	REG SEL Indication	1111 111 111 111 101	
360.	REG SEL Indication	1111 111 111 111 110	
376.	REG SEL Indication	1101 010 101 010 101	
378.	REG SEL Indication	0000 000 000 000 000	
380.	REG SEL Indication	0010 101 010 101 010	
382.	REG SEL Indication	1111 111 111 111 111	
384.	REG SEL Indication	1111 111 111 111 111	
385.	REG SEL Indication	1111 111 111 111 111	
388.	REG SEL Indication	0011 111 111 111 111	
391.	REG SEL Indication	1101 111 111 111 111	
394.	REG SEL Indication	1110 111 111 111 111	
397.	REG SEL Indication	1111 011 111 111 111	
400.	REG SEL Indication	1111 101 111 111 111	
403.	REG SEL Indication	1111 110 111 111 111	
406.	REG SEL Indication	1111 111 011 111 111	
409.	REG SEL Indication	1111 111 101 111 111	
412.	REG SEL Indication	1111 111 110 111 111	

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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
415.	REG SEL Indication	1111 111 111 011 111	
418.	REG SEL Indication	1111 111 111 101 111	
421.	REG SEL Indication	1111 111 111 110 111	
424.	REG SEL Indication	1111 111 111 111 011	
427.	REG SEL Indication	1111 111 111 111 101	
430.	REG SEL Indication	1111 111 111 111 110	
446.	REG SEL Indication	1111 110 101 010 101 (ECP 518, 1101 110 101 010 101	
448.	REG SEL Indication	1111 100 000 000 000 (ECP 518, 1101 100 000 000 000	
450.	REG SEL Indication	1111 101 010 101 010	
452.	REG SEL Indication	1111 111 111 111 111	
454.	REG SEL Indication	1111 111 111 111 111	
455.	REG SEL Indication	1111 111 111 111 111	
458.	REG SEL Indication	1111 111 111 111 111	
461.	REG SEL Indication	1111 111 111 111 111 (ECP 518, 1101 111 111 111 111	
464.	REG SEL Indication	1111 111 111 111 111	
467.	REG SEL Indication	1111 111 111 111 111	
470.	REG SEL Indication	1111 101 111 111 111	
473.	REG SEL Indication	1111 110 111 111 111	
476.	REG SEL Indication	1111 111 011 111 111	
479.	REG SEL Indication	1111 111 101 111 111	
482.	REG SEL Indication	1111 111 110 111 111	

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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
485.	REG SEL Indication	1111 111 111 011 111	
488.	REG SEL Indication	1111 111 111 101 111	
491.	REG SEL Indication	1111 111 111 110 111	
494.	REG SEL Indication	1111 111 111 111 011	
497.	REG SEL Indication	1111 111 111 111 101	
500.	REG SEL Indication	1111 111 111 111 110	
501.	REG SEL Indication	Bit 14 is a zero	
502.	REG SEL Indication	Bit 14 is a one	
516.	REG SEL Indication	1100 110 101 010 101	
518.	REG SEL Indication	1100 110 000 000 000	
520.	REG SEL Indication	1100 111 010 101 010	
522.	REG SEL Indication	1100 111 111 111 111	
524.	REG SEL Indication	1100 111 111 111 111	
525.	REG SEL Indication	1100 111 111 111 111	
528.	REG SEL Indication	1100 110 111 111 111	
531.	REG SEL Indication	1100 111 011 111 111	
534.	REG SEL Indication	1100 111 101 111 111	
537.	REG SEL Indication	1100 011 110 111 111	
540.	REG SEL Indication	1100 111 111 011 111	
543.	REG SEL Indication	1100 111 111 101 111	
546.	REG SEL Indication	1100 111 111 110 111	
549.	REG SEL Indication	1100 111 111 111 011	
552.	REG SEL Indication	1100 111 111 111 101	
555.	REG SEL Indication	1100 111 111 111 110	

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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
563.	Frequency (XC 191)	51,200.00 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4A	
	Droop (E)	NMT 0.2A	
	Noise (F)	NMT 0.4 volts p-p	
564.	Frequency (XC 048)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4A	
	Droop (E)	NMT 0.2A	
	Noise (F)	NMT 0.4 volt p-p	
565.	Frequency (XC139)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4A	
	Droop (E)	NMT 0.2A	
	Noise (F)	NMT 0.4 volt p-p	

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Step	Parameter	Specification	Results
566.	Frequency (XC 140)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
567.	Frequency (XC 197)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
568.	Frequency (XC 149)	800.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	

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Step	Parameter	Specification	Results
569.	Frequency (XC 150)	800.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
570.	Frequency (XC 151)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
571.	Frequency (XC 152)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	

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Step	Parameter	Specification	Results
2 572.	Frequency (XC 155)	12,800.00 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
3 573.	Frequency (XC 901)	25,600.00 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
4 574.	Frequency (XC 052)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	

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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
	Rise Time (C)	NMT 0.2 μ sec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	

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JOB INPUT/OUTPUT REGISTERS TEST

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SUBSYSTEM Computer
ASSY. Block II C-Computer

DESCRIPTION

Tests the operation of the computer input-output channels 5, 6, 12, 30, 31, 32, and 33. Procedures for checking input-output and continuous interface signals are also provided.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES JDC's 05401, 05405, 05413, 05414, ND-1021042, ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface panels are set-up as specified in JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the XY and RDC Interface panels of the CTS.

3. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

4. On the RDC Interface panel, set the CHV METERS switch to the DCVM position.

OPERATION

5. Press the LOAD CHAN V 2K OHMS and LOAD CHAN V 1K OHMS annunciators on the RDC Interface panel to energize.

6. Test signals RD086 and RD087 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 301.

b. Observe the digital voltmeter indication on the Power Control panel. Record on data sheet.

c. Press the LOAD CHAN V 2K OHMS annunciator to the off position.

7. Test signals RD166 and RD861 as follows:

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a. Set the CHANNEL V switches to position 305.

b. Observe the digital voltmeter indication. Record on data sheet.

8. Test signals RD863 and RD869 as follows:

a. Set the CHANNEL V switches to position 306.

b. Observe the digital voltmeter indication. Record on data sheet.

9. Test signals RD865 and RD904 as follows:

a. Set the CHANNEL V switches to position 307.

b. Observe the digital voltmeter indication. Record on data sheet.

10. Test signals RD866 and RD867 as follows:

a. Set the CHANNEL V switches to 308.

b. Observe the digital voltmeter indication. Record on data sheet.

11. Test signals RD868 and RD870 as follows:

a. Press the LOAD CHAN V 1K OHMS annunciator to the off position, and press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 309.

c. Observe the digital voltmeter indication. Record on data sheet.

12. Test signals RD877 and RD878 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position, and press the LOAD CHAN V 1K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 313.

c. Observe the digital voltmeter indication. Record on data sheet.

13. Test signal RD091 as follows:

a. Press the LOAD CHAN V 1K OHMS announciator to the off position, and press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 302.

c. Observe the digital voltmeter indication. Record on data sheet.

14. Test signal RD101 as follows:

a. Set the CHANNEL V switches to position 303.

b. Observe the digital voltmeter indication. Record on data sheet.

15. Test signal RD907 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position, and press the LOAD CHAN V 1K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 310.

c. Observe the digital voltmeter indication. Record on data sheet.

16. Test signal RD874 as follows:

a. Set the CHANNEL V switches to position 311.

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b. Observe the digital voltmeter indication. Record on data sheet.

17. Test signal RD876 as follows:

a. Press the LOAD CHAN V 1K OHMS annunciator to the off position and press the LOAD CHAN V 2K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 312.

c. Observe the digital voltmeter indication. Record on data sheet.

18. Test signal RD879 as follows:

a. Set the CHANNEL V switches to position 314.

b. Observe the digital voltmeter indication. Record on data sheet.

19. Test signal RD251 as follows:

a. Set the CHANNEL V switches to position 319.

b. Observe the digital voltmeter indication (0 vdc). Record on data sheet.

20. Test signal RD903 as follows:

a. Set the CHANNEL V switches to position 401.

b. Observe the digital voltmeter indication. Record on data sheet.

21. Test signal RD175 as follows:

a. Set the CHANNEL V switches to position 402.

b. Observe the digital voltmeter indication (2 vdc). Record on data sheet.

22. Test signal RD176 as follows:

a. Set the CHANNEL V switches to position 403.

b. Observe the digital voltmeter indication (7.0 vdc). Record on data sheet.

23. Test signal RD177 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position and press the LOAD CHAN V 1K OHMS annunciator to the on position.

b. Set the CHANNEL V switches to position 411.

c. Observe the digital voltmeter indication (2 vdc.) Record on data sheet.

24. Press LOAD CHAN V 1K OHMS to de-energize.

25. Set the CHANNEL V switches to position 101.

CHANNEL 5 CHECK

26. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00125.

27. Verify that the RZ display is 0000 000 000 000 101.

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28. Verify that the REG SEL display is 0000 000 001 010 101.

29. Press the CHANNEL button.

30. Press the EXECUTE button.

31. Verify that the LINC indicator is on.

32. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

33. Verify that the RZ display is 0000 000 000 000 101.

34. Press the CHANNEL button.

35. Press the EXECUTE button.

36. Verify that the OINC indicator is on.

37. Verify that the REG SEL display is 0000 000 001 010 101. Stamp data sheet.

38. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00252.

39. Verify that the RZ display is 0000 000 000 000 101.

40. Verify that the REG SEL display is 0000 000 010 101 010.

41. Press the CHANNEL button.

42. Press the EXECUTE button.

43. Verify that the LINC indicator is on.

44. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

45. Verify that the RZ display is 0000 000 000 000 101.

46. Press the CHANNEL button.

47. Press the EXECUTE button.

48. Verify that the OINC indicator is on.

49. Verify that the REG SEL display is 0000 000 010 101 010. Stamp data sheet.

50. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00000.

51. Verify that the RZ display is 0000 000 000 000 101.

52. Verify that the REG SEL display is 0000 000 000 000 000.

53. Press the CHANNEL button.

54. Press the EXECUTE button.

55. Verify that the LINC indicator is on.

56. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

57. Verify that the RZ display is 0000 000 000 000 101.

58. Press the CHANNEL button.

59. Press the EXECUTE button.

60. Verify that the OINC indicator is on.

61. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

62. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00377.

63. Verify that the RZ display is 0000 000 000 000 101.

64. Verify that the REG SEL display is 0000 000 011 111 111.

65. Press the CHANNEL button.

66. Press the EXECUTE button.

67. Verify that the LINC indicator is on.

68. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

69. Verify that the RZ display is 0000 000 000 000 101.

70. Press the CHANNEL button.

71. Press the EXECUTE button.

72. Verify that the OINC indicator is on.

73. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

74. Press FRESH START.

75. Press the READ-AGC pushbutton.

a. Press the CL Key.

b. Press Keys 0005.

76. Verify that the RZ display is 0000 000 000 000 101.

77. Press the CHANNEL button.

78. Press the EXECUTE button.

79. Verify that the OINC indicator is on.

80. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

DC OUTPUT TEST

81. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00005.

c. Press Keys 00377.

82. Verify that the RZ display is 0000 000 000 000 101.

83. Verify that the REG SEL display is 0000 000 011 111 111.

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84. Press the CHANNEL button.

85. Press the EXECUTE button.

86. Verify that the LINC indicator is on.

87. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0005.

88. Verify that the RZ display is 0000 000 000 000 101.

89. Press the CHANNEL button.

90. Press the EXECUTE button.

91. Verify that the OINC indicator is on.

92. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

93. On the Power Control panel:

a. Set the RANGE SELECT switch to the 40V position.

b. Set the VOLTAGE SELECT switch to the RDC position.

94. Set the CHV METERS switch on the RDC Interface panel to the DCVM position.

95. Depress the LOAD CHAN V 1K OHMS annunciator on the RDC Interface panel to energize.

96. Test signal CB801 as follows:

a. Set the CHANNEL V switch on the RDC Interface panel to position 601.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

97. Test signal CB806 as follows:

a. Set the CHANNEL V switches on the RDC Interface panel to position 602.

b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

98. Test signal CB805 as follows:

a. Set the CHANNEL V switches to position 603.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

99. Test signal CB802 as follows:

a. Set the CHANNEL V switches to position 604.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

100. Test signal CB803 as follows:

a. Set the CHANNEL V switches to position 605.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

101. Test signal CB808 as follows:

a. Set the CHANNEL V switches to position 606.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

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102. Test signal CB807 as follows:

a. Set the CHANNEL V switches to position 607.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

103. Test signal CB804 as follows:

a. Set the CHANNEL V switches to position 608.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

104. Set the CHV METERS switch to the OFF position.

105. Press LOAD CHAN V 1K OHMS to de-energize.

106. Set the CHANNEL V switches to position 101.

CHANNEL 6 CHECK

107. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00125.

108. Verify that the RZ display is 0000 000 000 000 110.

109. Verify that the REG SEL display is 0000 000 001 010 101.

110. Press the CHANNEL button.

111. Press the EXECUTE button.

112. Verify that the LINC indicator is on.

113. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

114. Verify that the RZ display is 0000 000 000 000 110.

115. Press the CHANNEL button.

116. Press the EXECUTE button.

117. Verify that the OINC indicator is on.

118. Verify that the REG SEL display is 0000 000 001 010 101. Stamp data sheet.

119. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00252.

120. Verify that the RZ display is 0000 000 000 000 110.

121. Verify that the REG SEL display is 0000 000 010 101 010.

122. Press the CHANNEL button.

123. Press the EXECUTE button.

124. Verify that the LINC indicator is on.

125. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

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b. Press Keys 0006.

126. Verify that the RZ display is 0000 000 000 000 110.

127. Press the CHANNEL button.

128. Press the EXECUTE button.

129. Verify that the OINC indicator is on.

130. Verify that the REG SEL display is 0000 000 010 101 010. Stamp data sheet.

131. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00000.

132. Verify that the RZ display is 0000 000 000 000 110.

133. Verify that the REG SEL display is 0000 000 000 000 000.

134. Press the CHANNEL button.

135. Press the EXECUTE button.

136. Verify that the LINC indicator is on.

137. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

138. Verify that the RZ display is 0000 000 000 000 110.

139. Press the CHANNEL button.

140. Press the EXECUTE button.

141. Verify that the OINC indicator is on.

142. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

143. Press the KEYBOARD LOAD pushbutton indicator.

a. Press the CL Key.

b. Press Keys 00006.

c. Press Keys 00377.

144. Verify that the RZ display is 0000 000 000 000 110.

145. Verify that the REG SEL display is 0000 000 011 111 111.

146. Press the CHANNEL button.

147. Press the EXECUTE button.

148. Verify that the LINC indicator is on.

149. Press the READ-AGC pushbutton indicator.

a. Press the CL Key.

b. Press Keys 0006.

150. Verify that the RZ display is 0000 000 000 000 110.

151. Press the CHANNEL button.

152. Press the EXECUTE button.

153. Verify that the OINC indicator is on.

154. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

155. Press FRESH START.

156. Press the READ-AGC pushbutton indicator.

- a. Press the CL Key.
- b. Press Keys 0006.

157. Verify that the RZ display is 0000 000 000 000 110.

158. Press the CHANNEL button.

159. Press the EXECUTE button.

160. Verify that the OINC indicator is on.

161. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

DC OUTPUT TEST

162. Press the KEYBOARD LOAD pushbutton indicator.

- a. Press the CL Key.
- b. Press Keys 00006.
- c. Press Keys 00377.

163. Verify that the RZ display is 0000 000 000 000 110.

164. Verify that the REG SEL display is 0000 000 011 111 111.

165. Press the CHANNEL button.

166. Press the EXECUTE button.

167. Verify that the LINC indicator is on.

168. Press the READ-AGC pushbutton indicator.

- a. Press the CL Key.
- b. Press Keys 0006.

169. Verify that the RZ display is 0000 000 000 000 110.

170. Press the CHANNEL button.

171. Press the EXECUTE button.

172. Verify that the OINC indicator is on.

173. Verify that the REG SEL display is 0000 000 011 111 111. Stamp data sheet.

174. On the Power Control panel:

- a. Set the RANGE SELECT switch to the 40V position.
- b. Set the VOLTAGE SELECT switch to the RDC position.

175. Set the CHV METERS switch on the RDC Interface panel to the DCVM position.

176. Press the LOAD CHAN V 1K OHMS annunciator on the RDC Interface panel to energize.

177. Test signal CB813 as follows:

- a. Set the CHANNEL V switches on the RDC Interface panel to position 609.
- b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

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178. Test signal CB816 as follows:

- a. Set the CHANNEL V switches to position 610.
- b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

179. Test signal CB815 as follows:

- a. Set the CHANNEL V switches to position 611.
- b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

180. Test signal CB814 as follows:

- a. Set the CHANNEL V switches to position 612.
- b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

181. Test signal CB809 as follows:

- a. Set the CHANNEL V switches to position 613.
- b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

182. Test signal CB812 as follows:

- a. Set the CHANNEL V switches to position 614.
- b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

183. Test signal CB811 as follows:

- a. Set the CHANNEL V switches to position 615.
- b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

184. Test signal CB810 as follows:

- a. Set the CHANNEL V switches to position 616.
- b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

185. Set the CHV METERS switch to the OFF position.

186. Press LOAD CHAN V 1K OHMS to de-energize.

187. Set the CHANNEL V switches to position 101.

188. Press the KEYBOARD LOAD pushbutton indicator.

189. Press the CL Key.

190. Press Keys 00012.

191. Press Keys 52525.

192. Verify that the RZ display is 0000 000 000 001 010.

193. Verify that the REG SEL display is 0101 010 101 010 101.

194. Press the CHANNEL button.

195. Press the EXECUTE button.

196. Verify that the LINC indicator is on.

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197. Press the READ-AGC pushbutton indicator.

198. Press the CL Key.

199. Press Keys 0012.

200. Verify that the RZ display is 0000 000 000 001 010.

201. Press the CHANNEL button.

202. Press the EXECUTE button.

203. Verify that the OINC indicator is on.

204. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

205. Press the KEYBOARD LOAD pushbutton indicator.

206. Press the CL Key.

207. Press Keys 00012.

208. Press Keys 25252.

209. Verify that the RZ display is 0000 000 000 001 010.

210. Verify that the REG SEL display is 0010 101 010 101 010.

211. Press the CHANNEL button.

212. Press the EXECUTE button.

213. Verify that the LINC indicator is on.

214. Press the READ-AGC pushbutton indicator.

215. Press the CL Key.

216. Press Keys 0012.

217. Verify that the RZ display is 0000 000 000 001 010.

218. Press the CHANNEL button.

219. Press the EXECUTE button.

220. Verify that the OINC indicator is on.

221. Verify that the REG SEL display is 0010 101 010 101 010. Stamp data sheet.

222. Press the KEYBOARD LOAD pushbutton indicator.

223. Press the CL Key.

224. Press Keys 00012.

225. Press Keys 00000.

226. Verify that the RZ display is 0000 000 000 001 010.

227. Verify that the REG SEL display is 0000 000 000 000 000.

228. Press the CHANNEL button.

229. Press the EXECUTE button.

230. Verify that the LINC indicator is on.

231. Press the READ-AGC pushbutton indicator.

232. Press the CL Key.

233. Press Keys 0012.

234. Verify that the RZ display is 0000 000 000 001 010.

235. Press the CHANNEL button.

236. Press the EXECUTE button.

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237. Verify that the OINC indicator is on.

238. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

239. Press the KEYBOARD LOAD pushbutton indicator.

240. Press the CL Key.

241. Press Keys 00012.

242. Press Keys 77777.

243. Verify that the RZ display is 0000 000 000 001 010.

244. Verify that the REG SEL display is 0111 111 111 111 111.

245. Press the CHANNEL button.

246. Press the EXECUTE button.

247. Verify that the LINC indicator is on.

248. Press the READ-AGC pushbutton indicator.

249. Press the CL Key.

250. Press Keys 0012.

251. Verify that the RZ display is 0000 000 000 001 010.

252. Press the CHANNEL button.

253. Press the EXECUTE button.

254. Verify that the OINC indicator is on.

255. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

256. Press FRESH START.

257. Press the CL Key.

258. Press Keys 0012.

259. Verify that the RZ display is 0000 000 000 001 010.

260. Press the CHANNEL button.

261. Press the EXECUTE button.

262. Verify that the OINC indicator is on.

263. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

264. On the Power Control panel:

- a. Set the RANGE SELECT switch to the 40V position.
- b. Set the VOLTAGE SELECT switch to the RDC position.

265. On the RDC Interface panel:

- a. Set the CHV METERS switch to the DCVM position.
- b. Depress the LOAD CHAN V 1K OHMS annunciator to energize.

266. Depress the LOAD CHAN V 2K OHMS annunciator to energize.

267. Test signal CB013 as follows:

- a. Set the CHANNEL V switches on the RDC Interface panel to position 520.
- b. Observe the digital voltmeter indication (2.5 vdc) on the Power Control panel. Record on data sheet.

268. Press the KEYBOARD LOAD pushbutton indicator.

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269. Press the CL Key.

270. Press Keys 00012.

271. Press Keys 77777.

272. Verify that the RZ display is 0000 000 000 001 010.

273. Verify that the REG SEL display is 0111 111 111 111 111.

274. Press the CHANNEL button.

275. Press the EXECUTE button.

276. Verify that the LINC indicator is on.

277. Verify that the M34 indicator (CB233) on the XY Interface panel is on. Stamp data sheet.

278. Verify that the M36 indicator (CB234) on the XY Interface panel is on. Stamp data sheet.

279. Test signal CB909 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position.

b. Set the CHANNEL V switches to position 405.

c. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

280. Test signal CB160 as follows:

a. Set the CHANNEL V switches to position 406.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

281. Test signal CB906 as follows:

a. Set the CHANNEL V switch to position 501.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

282. Test signal CB185 as follows:

a. Set the CHANNEL V switches to position 502.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

283. Test signal CB186 as follows:

a. Set the CHANNEL V switches to position 503.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

284. Test signal CB902 as follows:

a. Set the CHANNEL V switches to position 504.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

285. Test signal CB162. as follows:

a. Set the CHANNEL V switches to position 505.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

286. Test signal CB011 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the on position.

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b. Set the CHANNEL V switches to position 506.

c. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

287. Test signal CB161 as follows:

a. Press the LOAD CHAN V 2K OHMS annunciator to the off position.

b. Set the CHANNEL V switches to position 507.

c. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

288. Test signal CB194 as follows:

a. Set the CHANNEL V switches to position 508.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

289. Test signal CB195 as follows:

a. Set the CHANNEL V switches to position 509.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

290. Test signal CB196 as follows:

a. Set the CHANNEL V switches to position 510.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

291. Test signal CB841 as follows:

a. Set the CHANNEL V switches to position 617.

b. Observe the digital voltmeter indication (2.5 vdc). Record on data sheet.

292. Set the CHV METERS switch to the OFF position.

293. Press LOAD CHAN V 1K OHMS to de-energize.

CHANNEL 30 CHECK

294. Press the READ-AGC indicator switch to the on (illuminated) position.

295. Press Keys CL, 0030.

296. Verify that the RZ display is 0000 000 000 011 000.

297. Press the CHANNEL button.

298. Press the EXECUTE button.

299. Verify that the OINC indicator is on.

300. Press the FORCED READ indicator switch to the on (illuminated) position.

301. Set the T12 COUNTER STOP switch to the OFF position.

302. Press the PROCEED button.

303. Verify that the OINC indicator is on.

304. Verify that the STPIT indicator is off.

NOTE: The annunciators listed in this procedure are indicator switches, which are alternately depressed to energize (illuminated) and alternately depressed to de-energize (extinguished).

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305. Energize the following annunciators:

a. CH30-14/IN0-14

b. CH30-12/IN0-12

c. CH30-10/IN0-10

d. CH30-8/IN0-8

e. CH30-6/IN0-6

f. CH30-4/IN0-4

g. CH30-2/IN0-2

306. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

307. Energize the following annunciators:

a. CH30-15/IN0-15

b. CH30-13/IN0-13

c. CH30-11/IN0-11

d. CH30-9/IN0-9

e. CH30-7/IN0-7

f. CH30-5/IN0-5

g. CH30-3/IN0-3

h. CH30-1/IN0-1

308. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

309. De-energize the following annunciators:

a. CH30-14/IN0-14

b. CH30-12/IN0-12

c. CH30-10/IN0-10

d. CH30-8/IN0-8

e. CH30-6/IN0-6

f. CH30-4/IN0-4

g. CH30-2/IN0-2

310. Verify that the REG SEL display is 0010 101 010 101 010. Stamp data sheet.

311. De-energize the following annunciators:

a. CH30-15/IN0-15

b. CH30-13/IN0-13

c. CH30-11/IN0-11

d. CH30-9/IN0-9

e. CH30-7/IN0-7

f. CH30-5/IN0-5

g. CH30-3/IN0-3

h. CH30-1/IN0-1

312. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

High Zero Test

313. Set the DE MARGINS switch to the V0 position.

314. Energize the CH30-15/IN0-15 through CH30-1/IN0-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

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315. De-energize the CH30- /IN0-15 through CH30-1/IN0-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

316. Set the DE MARGINS switch to the V1 position.

317. Energize the CH30-15/IN0-15 annunciator.

318. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

319. De-energize the CH30-15/IN0-15 annunciator.

320. Energize the CH30-14/IN0-14 annunciator.

321. Verify that the REG SEL display is 1101 111 111 111 111. Stamp data sheet.

322. De-energize the CH30-14/IN0-14 annunciator.

323. Energize the CH30-13/IN0-13 annunciator.

324. Verify that the REG SEL display is 1110 111 111 111 111. Stamp data sheet.

325. De-energize the CH30-13/IN0-13 annunciator.

326. Energize the CH30-12/IN0-12 annunciator.

327. Verify that the REG SEL display is 1111 011 111 111 111. Stamp data sheet.

328. De-energize the CH30-12/IN0-12 annunciator.

329. Energize the CH30-11/IN0-11 annunciator.

330. Verify that the REG SEL display is 1111 101 111 111 111. Stamp data sheet.

331. De-energize the CH30-11/IN0-11 annunciator.

332. Energize the CH30-10/IN0-10 annunciator.

333. Verify that the REG SEL display is 1111 110 111 111 111. Stamp data sheet.

334. De-energize the CH30-10/IN0-10 annunciator.

335. Energize the CH30-9/IN0-9 annunciator.

336. Verify that the REG SEL display is 1111 111 011 111 111. Stamp data sheet.

337. De-energize the CH30-9/IN0-9 annunciator.

338. Energize the CH30-8/IN0-8 annunciator.

339. Verify that the REG SEL display is 1111 111 101 111 111. Stamp data sheet.

340. De-energize the CH30-8/IN0-8 annunciator.

341. Energize the CH30-7/IN0-7 annunciator.

342. Verify that the REG SEL display is 1111 111 110 111 111. Stamp data sheet.

343. De-energize the CH30-7/IN0-7 annunciator.

344. Energize the CH30-6/IN0-6 annunciator.

345. Verify that the REG SEL display is 1111 111 111 011 111. Stamp data sheet.

346. De-energize the CH30-6/IN0-6 annunciator.

347. Energize the CH30-5/IN0-5 annunciator.

348. Verify that the REG SEL display is 1111 111 111 101 111. Stamp data sheet.

349. De-energize the CH-5/IN0-5 annunciator.

350. Energize the CH30-4/IN0-4 annunciator.

351. Verify that the REG SEL display is 1111 111 111 110 111. Stamp data sheet.

352. De-energize the CH30-4/IN0-4 annunciator.

353. Energize the CH30-3/IN0-3 annunciator.

354. Verify that the REG SEL display is 1111 111 111 111 011. Stamp data sheet.

355. De-energize the CH30-3/IN0-3 annunciator.

356. Energize the CH30-2/IN0-2 annunciator.

357. Verify that the REG SEL display is 1111 111 111 111 101. Stamp data sheet.

358. De-energize the CH30-2/IN0-2 annunciator.

359. Energize the CH30-1/IN0-1 annunciator.

360. Verify that the REG SEL display is 1111 111 111 111 110. Stamp data sheet.

361. De-energize the CH30-1/IN0-1 annunciator.

362. Set the DE MARGINS switch to the NORM position.

363. Set the T12 COUNTER STOP switch to the ON position.

364. De-energize the FORCED READ annunciator.

CHANNEL 31 CHECK

365. Press Keys CL, 0031.

366. Verify that the RZ display is 0000 000 000 011 001.

367. Press the CHANNEL button.

368. Press the EXECUTE button.

369. Verify that the OINC indicator is on.

370. Press the FORCED READ indicator switch to the on (illuminated) position.

371. Set the T12 COUNTER STOP switch to the OFF position.

372. Press the PROCEED button.

373. Verify that the OINC indicator is on.

374. Verify that the STPIT indicator is off.

375. Energize the following annunciators:

   a. CH31-14/IN2-14
   b. CH31-12/IN2-12
   c. CH31-10/IN2-10
   d. CH31-8/IN2-8
   e. CH31-6/IN2-6
   f. CH31-4/IN2-4

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   g. CH31-2/IN2-2

376. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

377. Energize the following annunciators:

   a. CH31-15/IN2-15
   b. CH31-13/IN2-13
   c. CH31-11/IN2-11
   d. CH31-9/IN2-9
   e. CH31-7/IN2-7
   f. CH31-5/IN2-5
   g. CH31-3/IN2-3
   h. CH31-1/IN2-1

378. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

379. De-energize the following annunciators:

   a. CH31-14/IN2-14
   b. CH31-12/IN2-12
   c. CH31-10/IN2-10
   d. CH31-8/IN2-8
   e. CH31-6/IN2-6
   f. CH31-4/IN2-4
   g. CH31-2/IN2-2

380. Verify that the REG SEL display is 0010 101 010 101 010. Stamp data sheet.

381. De-energize the following annunciators:

   a. CH31-15/IN2-15
   b. CH31-13/IN2-13
   c. CH31-11/IN2-11
   d. CH31-9/IN2-9
   e. CH31-7/IN2-7
   f. CH31-5/IN2-5
   g. CH31-3/IN2-3
   h. CH31-1/IN2-1

382. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

High Zero Test

383. Set the DE MARGINS switch to the V0 position.

384. Energize the CH31-15/IN2-15 through CH31-1/IN2-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

385. De-energize the CH31-15/IN2-15 through CH31-1/IN2-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

386. Set the DE MARGINS switch to the V1 position.

387. Energize the CH31-15/IN2-15 annunciator.

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388. Verify that the REG SEL display is 0011 111 111 111 111. Stamp data sheet.

389. De-energize the CH31-15/IN2-15 annunciator.

390. Energize the CH31-14/IN2-14 annunciator.

391. Verify that the REG SEL display is 1101 111 111 111 111. Stamp data sheet.

392. De-energize the CH31-14/IN2-14 annunciator.

393. Energize the CH31-13/IN2-13 annunciator.

394. Verify that the REG SEL display is 1110 111 111 111 111. Stamp data sheet.

395. De-energize the CH31-13/IN2-13 annunciator.

396. Energize the CH31-12/IN2-12 annunciator.

397. Verify that the REG SEL display is 1111 011 111 111 111. Stamp data sheet.

398. De-energize the CH31-12/IN2-12 annunciator.

399. Energize the CH31-11/IN2-11 annunciator.

400. Verify that the REG SEL display is 1111 101 111 111 111. Stamp data sheet.

401. De-energize the CH31-11/IN2-11 annunciator.

402. Energize the CH31-10/IN2-10 annunciator.

403. Verify that the REG SEL display is 1111 110 111 111 111. Stamp data sheet.

404. De-energize the CH31-10/IN2-10 annunciator.

405. Energize the CH31-9/IN2-9 annunciator.

406. Verify that the REG SEL display is 1111 111 011 111 111. Stamp data sheet.

407. De-energize the CH31-9/IN2-9 annunciator.

408. Energize the CH31-8/IN2-8 annunciator.

409. Verify that the REG SEL display is 1111 111 101 111 111. Stamp data sheet.

410. De-energize the CH31-8/IN2-8 annunciator.

411. Energize the CH31-7/IN2-7 annunciator.

412. Verify that the REG SEL display is 1111 111 110 111 111. Stamp data sheet.

413. De-energize the CH31-7/IN2-7 annunciator.

414. Energize the CH31-6/IN2-6 annunciator.

415. Verify that the REG SEL display is 1111 111 111 011 111. Stamp data sheet.

416. De-energize the CH31-6/IN2-6 annunciator.

417. Energize the CH31-5/IN2-5 annunciator.

418. Verify that the REG SEL display is 1111 111 111 101 111. Stamp data sheet.

419. De-energize the CH31-5/IN2-5 annunciator.

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420. Energize the CH31-4/IN2-4 annunciator.

421. Verify that the REG SEL display is 1111 111 111 110 111. Stamp data sheet.

422. De-energize the CH31-4/IN2-4 annunciator.

423. Energize the CH31-3/IN2-3 annunciator.

424. Verify that the REG SEL display is 1111 111 111 111 011. Stamp data sheet.

425. De-energize the CH31-3/IN2-3 annunciator.

426. Energize the CH31-2/IN2-2 annunciator.

427. Verify that the REG SEL display is 1111 111 111 111 101. Stamp data sheet.

428. De-energize the CH31-2/IN2-2 annunciator.

429. Energize the CH31-1/IN2-1 annunciator.

430. Verify that the REG SEL display is 1111 111 111 111 110. Stamp data sheet.

431. De-energize the CH31-1/IN2-1 annunciator.

432. Set the DE MARGINS switch to the NORM position.

433. Set the T12 COUNTER STOP switch to the ON position.

434. De-energize the FORCED READ annunciator.

CHANNEL 32 CHECK

NOTE: If ECP 518 has been incorporated, CH32-14/IN3-14 will be functional as shown in the following displays.

435. Press Keys CL, 0032.

436. Verify that the RZ display is 0000 000 000 011 010.

437. Press the CHANNEL button.

438. Press the EXECUTE button.

439. Verify that the OINC indicator is on.

440. Press the FORCED READ indicator switch to the on (illuminated) position.

441. Set the T12 COUNTER STOP switch to the OFF position.

442. Press the PROCEED button.

443. Verify that the OINC indicator is on.

444. Verify that the STPIT indicator is off.

445. Energize the following annunciators:

   a. CH32-14/IN3-14
   b. CH32-12/IN3-12
   c. CH32-10/IN3-10
   d. CH32-8/IN3-8
   e. CH32-6/IN3-6
   f. CH32-4/IN3-4

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g. CH32-2/IN3-2

446. Verify that the REG SEL display is 1101 110 101 010 101. (Without ECP 518, 1111 110 101 010 101). Stamp data sheet.

447. Energize the following annunciators:

a. CH32-15/IN3-15

b. CH32-13/IN3-13

c. CH32-11/IN3-11

d. CH32-9/IN3-9

e. CH32-7/IN3-7

f. CH32-5/IN3-5

g. CH32-3/IN3-3

h. CH32-1/IN3-1

448. Verify that the REG SEL display is 1101 100 000 000 000. (Without ECP 518, 1111 100 000 000 000). Stamp data sheet.

449. De-energize the following annunciators:

a. CH32-14/IN3-14

b. CH32-12/IN3-12

c. CH32-10/IN3-10

d. CH32-8/IN3-8

e. CH32-6/IN3-6

f. CH32-4/IN3-4

g. CH32-2/IN3-2

450. Verify that the REG SEL display is 1111 101 010 101 010. Stamp data sheet.

451. De-energize the following annunciators:

a. CH32-15/IN3-15

b. CH32-13/IN3-13

c. CH32-11/IN3-11

d. CH32-9/IN3-9

e. CH32-7/IN3-7

f. CH32-5/IN3-5

g. CH32-3/IN3-3

h. CH32-1/IN3-1

452. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

High Zero Test

453. Set the DE MARGINS switch to the V0 position.

454. Energize the CH32-15/IN3-15 through CH32-1/IN3-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

455. De-energize the CH32-15/IN3-15 through CH32-1/IN3-1 annunciators and verify that the REG SEL display remains 1111 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

456. Set the DE MARGINS switch to the V1 position.

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457. Energize the CH32-15/IN3-15 annunciator.

458. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

459. De-energize the CH32-15/IN3-15 annunciator.

460. Energize the CH32-14/IN3-14 annunciator.

461. Verify that the REG SEL display is 1101 111 111 111 111. (Without ECP 518, 1111 111 111 111 111). Stamp data sheet.

462. De-energize the CH32-14/IN3-14 annunciator.

463. Energize the CH32-13/IN3-13 annunciator.

464. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

465. De-energize the CH32-13/IN3-13 annunciator.

466. Energize the CH32-12/IN3-12 annunciator.

467. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

468. De-energize the CH32-12/IN3-12 annunciator.

469. Energize the CH32-11/IN3-11 annunciator.

470. Verify that the REG SEL display is 1111 101 111 111 111. Stamp data sheet.

471. De-energize the CH32-11/IN3-11 annunciator.

472. Energize the CH32-10/IN3-10 annunciator.

473. Verify that the REG SEL display is 1111 110 111 111 111. Stamp data sheet.

474. De-energize the CH32-10/IN3-10 annunciator.

475. Energize the CH32-9/IN3-9 annunciator.

476. Verify that the REG SEL display is 1111 111 011 111 111. Stamp data sheet.

477. De-energize the CH32-9/IN3-9 annunciator.

478. Energize the CH32-8/IN3-8 annunciator.

479. Verify that the REG SEL display is 1111 111 101 111 111. Stamp data sheet.

480. De-energize the CH32-8/IN3-8 annunciator.

481. Energize the CH32-7/IN3-7 annunciator.

482. Verify that the REG SEL display is 1111 111 110 111 111. Stamp data sheet.

483. De-energize the CH32-7/IN3-7 annunciator.

484. Energize the CH32-6/IN3-6 annunciator.

485. Verify that the REG SEL display is 1111 111 111 011 111. Stamp data sheet.

486. De-energize the CH32-6/IN3-6 annunciator.

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487. Energize the CH32-5/IN3-5 annunciator.

488. Verify that the REG SEL display is 1111 111 111 101 111. Stamp data sheet.

489. De-energize the CH32-5/IN3-5 annunciator.

490. Energize the CH32-4/IN3-4 annunciator.

491. Verify that the REG SEL display is 1111 111 111 110 111. Stamp data sheet.

492. De-energize the CH32-4/IN3-4 annunciator.

493. Energize the CH32-3/IN3-3 annunciator.

494. Verify that the REG SEL display is 1111 111 111 111 011. Stamp data sheet.

495. De-energize the CH32-3/IN3-3 annunciator.

496. Energize the CH32-2/IN3-2 annunciator.

497. Verify that the REG SEL display is 1111 111 111 111 101. Stamp data sheet.

498. De-energize the CH32-2/IN3-2 annunciator.

499. Energize the CH32-1/IN3-1 annunciator.

500. Verify that the REG SEL display is 1111 111 111 111 110. Stamp data sheet.

501. De-energize the CH32-1/IN3-1 annunciator.

502. Set the DE MARGINS switch to the NORM position.

503. Set the T12 COUNTER STOP switch to the ON position.

504. De-energize the FORCED READ annunciator.

CHANNEL 33 CHECK

505. Press Keys CL, 0033.

506. Verify that the RZ display is 0000 000 000 011 011.

507. Press the CHANNEL button.

508. Press the EXECUTE button.

509. Verify that the OINC indicator is on.

510. Press the FORCED READ indicator switch to the on (illuminated) position.

511. Set the T12 COUNTER STOP switch to the OFF position.

512. Press the PROCEED button.

513. Verify that the OINC indicator is on.

514. Verify that the STPIT indicator is off.

515. Energize the following annunciators:

a. CH33-10

b. CH33-8

c. CH33-6

d. CH33-4

e. CH33-2

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516. Verify that the REG SEL display is 1100 110 101 010 101. Stamp data sheet.

517. Energize the following annunciators:

a. CH33-9

b. CH33-7

c. CH33-5

d. CH33-3

e. CH33-1

518. Verify that the REG SEL display is 1100 110 000 000 000. Stamp data sheet.

519. De-energize the following annunciators:

a. CH33-10

b. CH33-8

c. CH33-6

d. CH33-4

e. CH33-2

520. Verify that the REG SEL display is 1100 111 010 101 010. Stamp data sheet.

521. De-energize the following annunciators:

a. CH33-9

b. CH33-7

c. CH33-5

d. CH33-3

e. CH33-1

522. Verify that the REG SEL display is 1100 111 111 111 111. Stamp data sheet.

High Zero Test

523. Set the DE MARGINS switch to the V0 position.

524. Energize the CH33-10 through CH33-1 annunciators and verify that the REG SEL display remains 1100 111 111 111 111 with no intermittent changes as the annunciators are being energized. Stamp data sheet.

525. De-energize the CH33-10 through CH33-1 annunciators and verify that the REG SEL display remains 1100 111 111 111 111 with no intermittent changes as the annunciators are being de-energized. Stamp data sheet.

Low One Test

526. Set the DE MARGINS switch to the V1 position.

527. Energize the CH33-10 annunciator.

528. Verify that the REG SEL display is 1100 110 111 111 111. Stamp data sheet.

529. De-energize the CH33-10 annunciator.

530. Energize the CH33-9 annunciator.

531. Verify that the REG SEL display is 1100 111 011 111 111. Stamp data sheet.

532. De-energize the CH33-9 annunciator.

533. Energize the CH33-8 annunciator.

534. Verify that the REG SEL display is 1100 111 101 111 111. Stamp data sheet.

535. De-energize the CH33-8 annunciator.

536. Energize the CH33-7 annunciator.

537. Verify that the REG SEL display is 1100 111 110 111 111. Stamp data sheet.

538. De-energize the CH33-7 annunciator.

539. Energize the CH33-6 annunciator.

540. Verify that the REG SEL display is 1100 111 111 011 111. Stamp data sheet.

541. De-energize the CH33-6 annunciator.

542. Energize the CH33-5 annunciator.

543. Verify that the REG SEL display is 1100 111 111 101 111. Stamp data sheet.

544. De-energize the CH33-5 annunciator.

545. Energize the CH33-4 annunciator.

546. Verify that the REG SEL display is 1100 111 111 110 111. Stamp data sheet.

547. De-energize the CH33-4 annunciator.

548. Energize the CH33-3 annunciator.

549. Verify that the REG SEL display is 1100 111 111 111 011. Stamp data sheet.

550. De-energize the CH33-3 annunciator.

551. Energize the CH33-2 annunciator.

552. Verify that the REG SEL display is 1100 111 111 111 101. Stamp data sheet.

553. De-energize the CH33-2 annunciator.

554. Energize the CH33-1 annunciator.

555. Verify that the REG SEL display is 1100 111 111 111 110. Stamp data sheet.

556. De-energize the CH33-1 annunciator.

557. Set the DE MARGINS switch to the NORM position.

558. Set the T12 COUNTER STOP switch to the ON position.

559. De-energize the FORCED READ annunciator.

CONTINUOUS SIGNALS CHECK

560. Perform the preparation section of Frequency Measurement, JDC 05401.

561. Perform the preparation section of Pulse Measurement, JDC 05405.

562. On the XY Interface panel:

a. Set the SCOPE switch to the DIFF S position.

b. Press LOAD CHAN S 510 OHMS to energize.

563. Test signal XC 191 as follows:

a. Set the CHANNEL S switches to the 104 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

DATE ______

c. Measure the frequency (51,200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

564. Test signal XC048 as follows:

a. Set the CHANNEL S switches to the 105 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the Frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

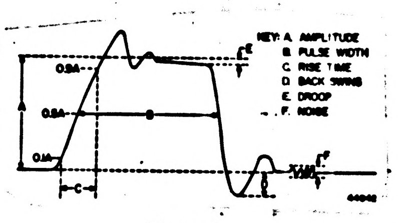

Figure 1

565. Test signal XC139 as follows:

a. Set the CHANNEL S switches to the 107 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

566. Test signal XC140 as follows:

a. Set the CHANNEL S switches to the 108 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

567. Test signal XC197 as follows:

a. Set the CHANNEL S switches to the 109 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

DATE ______

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

568. Test signal XC149 as follows:

a. Set the CHANNEL S switches on the XY Interface panel to the 110 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (800 cps) displayed on Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

569. Test signal XC150 as follows:

a. Set the CHANNEL S switches to the 111 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (800 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

570. Test signal XC151 as follows:

a. Set the CHANNEL S switches to the 112 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

571. Test signal XC152 as follows:

a. Set the CHANNEL S switches to the 113 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

572. Test signal XC155 as follows:

a. Set the CHANNEL S switches to the 116 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (12.8 kpps) displayed on the Frequency Counter. Record on data sheet.

DATE ______

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

573. Test signal XC901 as follows:

a. Set the CHANNEL S switches to the 117 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (25.6 kpps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

574. Test signal XC052 as follows:

a. Set the CHANNEL S switches to the 118 position.

b. Set the FREQ + PHASE switch to the FR S S → T position.

c. Measure the frequency (3200 cps) displayed on the Frequency Counter. Record on data sheet.

d. Set the FREQ + PHASE switch to the OFF position.

e. Measure the pulse characteristics shown on figure 1. Record on data sheet.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 12

JDC
NO. 05787
REV. ____
INITIAL TDRR 35464

JOB INPUT/OUTPUT REGISTERS TEST

ASSEMBLY UNDER TEST
TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY
DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
6.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
7.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
8.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
9.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
10.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
11.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
12.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
13.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
14.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
15.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
16.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
17.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
18.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	
19.	Digital Voltmeter Indication	0.0 (± 1.0) vdc	
20.	Digital Voltmeter Indication	13.5 (± 1.0) vdc	

DATE ____

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 12

JDC
NO. 05787
REV. ____

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
21.	Digital Voltmeter Indication	2.0 (±0.6) vdc	
22.	Digital Voltmeter Indication	7.0 (±0.25) vdc	
23.	Digital Voltmeter Indication	2.0 (±0.6) vdc	
37.	REG SEL Indication	0000 000 001 010 101	
49.	REG SEL Indication	0000 000 010 101 010	
61.	REG SEL Indication	0000 000 000 000 000	
73.	REG SEL Indication	0000 000 011 111 111	
80.	REG SEL Indication	0000 000 000 000 000	
92.	REG SEL Indication	0000 000 011 111 111	
96.	Digital Voltmeter Indication	2.5 vdc	
97.	Digital Voltmeter Indication	2.5 vdc	
98.	Digital Voltmeter Indication	2.5 vdc	
99.	Digital Voltmeter Indication	2.5 vdc	
100.	Digital Voltmeter Indication	2.5 vdc	
101.	Digital Voltmeter Indication	2.5 vdc	
102.	Digital Voltmeter Indication	2.5 vdc	
103.	Digital Voltmeter Indication	2.5 vdc	
118.	REG SEL Indication	0000 000 001 010 101	
130.	REG SEL Indication	0000 000 010 101 010	
142.	REG SEL Indication	0000 000 000 000 000	
154.	REG SEL Indication	0000 000 011 111 111	
161.	REG SEL Indication	0000 000 000 000 000	

DATE ____

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 12

JDC
NO. 05787
REV. ____

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
173.	REG SEL Indication	0000 000 011 111 111	
177.	Digital Voltmeter Indication	2.5 vdc	
178.	Digital Voltmeter Indication	2.5 vdc	
179.	Digital Voltmeter Indication	2.5 vdc	
180.	Digital Voltmeter Indication	2.5 vdc	
181.	Digital Voltmeter Indication	2.5 vdc	
182.	Digital Voltmeter Indication	2.5 vdc	
183.	Digital Voltmeter Indication	2.5 vdc	
184.	Digital Voltmeter Indication	2.5 vdc	
204.	REG SEL Indication	1101 010 101 010 101	
221.	REG SEL Indication	0010 101 010 101 010	
238.	REG SEL Indication	0000 000 000 000 000	
255.	REG SEL Indication	1111 111 111 111 111	
263.	REG SEL Indication	0000 000 000 000 000	
267.	Digital Voltmeter Indication	2.5 vdc	
277.	Illuminated XY Indicator	M34	
278.	Illuminated XY Indicator	M36	
279c.	Digital Voltmeter Indication	2.5 vdc	
280b.	Digital Voltmeter Indication	2.5 vdc	
281b.	Digital Voltmeter Indication	2.5 vdc	
282b.	Digital Voltmeter Indication	2.5 vdc	
283b.	Digital Voltmeter Indication	2.5 vdc	

DATE ____

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 12

JDC
NO. 05787
REV. ____

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
284b.	Digital Voltmeter Indication	2.5 vdc	
285b.	Digital Voltmeter Indication	2.5 vdc	
286c.	Digital Voltmeter Indication	2.5 vdc	
287c.	Digital Voltmeter Indication	2.5 vdc	
288b.	Digital Voltmeter Indication	2.5 vdc	
289b.	Digital Voltmeter Indication	2.5 vdc	
290b.	Digital Voltmeter Indication	2.5 vdc	
291b.	Digital Voltmeter Indication	2.5 vdc	
306.	REG SEL Indication	1101 010 101 010 101	
308.	REG SEL Indication	0000 000 000 000 000	
310.	REG SEL Indication	0010 101 010 101 010	
312.	REG SEL Indication	1111 111 111 111 111	
314.	REG SEL Indication	1111 111 111 111 111	
315.	REG SEL Indication	1111 111 111 111 111	
318.	REG SEL Indication	0000 000 000 000 000	
321.	REG SEL Indication	1101 111 111 111 111	
324.	REG SEL Indication	1110 111 111 111 111	
327.	REG SEL Indication	1111 011 111 111 111	
330.	REG SEL Indication	1111 101 111 111 111	
333.	REG SEL Indication	1111 110 111 111 111	
336.	REG SEL Indication	1111 111 011 111 111	
339.	REG SEL Indication	1111 111 101 111 111	

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 12

JDC
NO. 05787
REV. ____

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
342.	REG SEL Indication	1111 111 110 111 111	
345.	REG SEL Indication	1111 111 111 011 111	
348.	REG SEL Indication	1111 111 111 101 111	
351.	REG SEL Indication	1111 111 111 110 111	
354.	REG SEL Indication	1111 111 111 111 011	
357.	REG SEL Indication	1111 111 111 111 101	
360.	REG SEL Indication	1111 111 111 111 110	
376.	REG SEL Indication	1101 010 101 010 101	
378.	REG SEL Indication	0000 000 000 000 000	
380.	REG SEL Indication	0010 101 010 101 010	
382.	REG SEL Indication	1111 111 111 111 111	
384.	REG SEL Indication	1111 111 111 111 111	
385.	REG SEL Indication	1111 111 111 111 111	
388.	REG SEL Indication	0011 111 111 111 111	
391.	REG SEL Indication	1101 111 111 111 111	
394.	REG SEL Indication	1110 111 111 111 111	
397.	REG SEL Indication	1111 011 111 111 111	
400.	REG SEL Indication	1111 101 111 111 111	
403.	REG SEL Indication	1111 110 111 111 111	
406.	REG SEL Indication	1111 111 011 111 111	
409.	REG SEL Indication	1111 111 101 111 111	
412.	REG SEL Indication	1111 111 110 111 111	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 12

JDC
NO. 05787
REV. ____

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
415.	REG SEL Indication	1111 111 111 011 111	
418.	REG SEL Indication	1111 111 111 101 111	
421.	REG SEL Indication	1111 111 111 110 111	
424.	REG SEL Indication	1111 111 111 111 011	
427.	REG SEL Indication	1111 111 111 111 101	
430.	REG SEL Indication	1111 111 111 111 110	
446.	REG SEL Indication	1111 110 101 010 101 (ECP 518, 1101 110 101 010 101	
448.	REG SEL Indication	1111 100 000 000 000 (ECP 518, 1101 100 000 000 000	
450.	REG SEL Indication	1111 101 010 101 010	
452.	REG SEL Indication	1111 111 111 111 111	
454.	REG SEL Indication	1111 111 111 111 111	
455.	REG SEL Indication	1111 111 111 111 111	
458.	REG SEL Indication	1111 111 111 111 111	
461.	REG SEL Indication	1111 111 111 111 111 (ECP 518, 1101 111 111 111 111	
464.	REG SEL Indication	1111 111 111 111 111	
467.	REG SEL Indication	1111 111 111 111 111	
470.	REG SEL Indication	1111 101 111 111 111	
473.	REG SEL Indication	1111 110 111 111 111	
476.	REG SEL Indication	1111 111 011 111 111	
479.	REG SEL Indication	1111 111 101 111 111	
482.	REG SEL Indication	1111 111 110 111 111	

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 12

JDC
NO. 05787
REV. ____

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
485.	REG SEL Indication	1111 111 111 011 111	
488.	REG SEL Indication	1111 111 111 101 111	
491.	REG SEL Indication	1111 111 111 110 111	
494.	REG SEL Indication	1111 111 111 111 011	
497.	REG SEL Indication	1111 111 111 111 101	
500.	REG SEL Indication	1111 111 111 111 110	
516.	REG SEL Indication	1100 110 101 010 101	
518.	REG SEL Indication	1100 110 000 000 000	
520.	REG SEL Indication	1100 111 010 101 010	
522.	REG SEL Indication	1100 111 111 111 111	
524.	REG SEL Indication	1100 111 111 111 111	
525.	REG SEL Indication	1100 111 111 111 111	
528.	REG SEL Indication	1100 110 111 111 111	
531.	REG SEL Indication	1100 111 011 111 111	
534.	REG SEL Indication	1100 111 101 111 111	
537.	REG SEL Indication	1100 011 110 111 111	
540.	REG SEL Indication	1100 111 111 011 111	
543.	REG SEL Indication	1100 111 111 101 111	
546.	REG SEL Indication	1100 111 111 110 111	
549.	REG SEL Indication	1100 111 111 111 011	
552.	REG SEL Indication	1100 111 111 111 101	
555.	REG SEL Indication	1100 111 111 111 110	

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 12

JDC
NO. 05787
REV. ____

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
563.	Frequency (XC 191)	51,200.00 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4A	
	Droop (E)	NMT 0.2A	
	Noise (F)	NMT 0.4 volts p-p	
564.	Frequency (XC 048)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4A	
	Droop (E)	NMT 0.2A	
	Noise (F)	NMT 0.4 volt p-p	
565.	Frequency (XC139)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 μsec	
	Rise Time (C)	NMT 0.2 μsec	
	Back Swing (D)	NMT 0.4A	
	Droop (E)	NMT 0.2A	
	Noise (F)	NMT 0.4 volt p-p	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 OF 12

JDC
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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
566.	Frequency (XC 140)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
567.	Frequency (XC 197)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
568.	Frequency (XC 149)	800.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 OF 12

JDC
NO. 05787
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JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
569.	Frequency (XC 150)	800.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
570.	Frequency (XC 151)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
571.	Frequency (XC 152)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 OF 12

JDC
NO. 05787
REV. ____

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
572.	Frequency (XC 155)	12,800.00 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
573.	Frequency (XC 901)	25,600.00 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	
574.	Frequency (XC 062)	3200.0 ± 0.2 cps	
	Amplitude (A)	7 ± 2 volts	
	Pulse Width (B)	3.0 ± 0.5 µsec	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 OF 12

JDC
NO. 05787
REV. ____

JOB INPUT/OUTPUT REGISTERS TEST

Step	Parameter	Specification	Results
	Rise Time (C)	NMT 0.2 µsec	
	Back Swing (D)	NMT 0.4 A	
	Droop (E)	NMT 0.2 A	
	Noise (F)	NMT 0.4 volt p-p	

DATE ____________

JOB CDU COUNTERS TEST

JDC 05788 **REV.** A **PAGE** 1 **OF** 28 9

INITIAL TDRR 35464 **D.S. PGS** 5

SUBSYSTEM Computer

ASSY. Block II C-Computer

DESCRIPTION

Tests the operation of the CDU input-output counters, and associated interface circuitry under normal and marginal input conditions.

Rev. Let.	Date	TDRR NO	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	8-6-68	36667	19, 26	-	EA AD	-

REFERENCES JDC's 05402, 05413, 05414, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set-up as specified in JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the XY Interface panel of the CTS.

CDU X INPUT TEST

3. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

4. Press Keys CL, 00032, 37776.

5. Verify that the RZ display is 0000 000 000 011 010.

6. Verify that the REG SEL display is 0011 111 111 111 110.

7. Press the EXECUTE button.

8. Verify that the LINC indicator is on.

9. Verify that the RG display is 0011 111 111 111 110.

10. Set the AGREEMENT A switches to XXXX 0032.

11. Press the MONITOR indicator switch to the on (illuminated) position.

12. Set the T12 COUNTER STOP switch to the OFF position.

VERIFICATION WITH SIOL REQUIRED BEFORE USE **DATE** 18 JAN 68

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13. Set the INCREMENTS INHIBIT switch to the OFF position.

14. Set the AGC INPUT COUNTERS switch to position 3.

15. Press the POSITIVE indicator switch to the on (illuminated) position.

16. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

17. Set the Agreement A switch to SAMPLE.

18. Press the PROCEED button.

19. Press the SINGLE PULSE button.

20. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

21. Press the SINGLE PULSE button.

22. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

23. Press the SINGLE PULSE button.

24. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

25. Press the POSITIVE indicator switch to the off (extinguished) position.

26. Press the NEGATIVE indication switch to the on (illuminated) position.

27. Press the SINGLE PULSE button.

28. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

29. Press the SINGLE PULSE button twice.

30. Verify that the RG display is 0011 111 111 111 110.

31. Set the T12 COUNTER STOP switch to the ON position.

32. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

33. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

34. Press Keys CL, 00032, 37776.

35. Verify that the RZ display is 0000 000 000 011 010.

36. Verify that the REG SEL display is 0011 111 111 111 110.

37. Press the EXECUTE button.

38. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

39. Set the Y MARGINS switch to the V2 (High Zero) position.

40. Press the MONITOR indicator switch to the on (illuminated) position.

41. Press the NEGATIVE indicator switch to the off (extinguished) position.

42. Press the POSITIVE indicator switch to the on (illuminated) position.

43. Set the T12 COUNTER STOP switch to the OFF position.

44. Set the INCREMENTS INHIBIT switch to the OFF position.

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45. Press the PROCEED button.

46. Press the SINGLE PULSE button.

47. Verify that the RG display is 0011 111 111 111 110.

48. Press the SINGLE PULSE button.

49. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

50. Press the POSITIVE indicator switch to the off (extinguished) position.

51. Press the NEGATIVE indicator switch to the on (illuminated) position.

52. Press the SINGLE PULSE button.

53. Verify that the RG display is 0011 111 111 111 110.

54. Press the SINGLE PULSE button twice.

55. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

56. Set the T12 COUNTER STOP switch to the ON position.

57. Set the Y MARGINS switch to the V3 (Low One) position.

58. Set the T12 COUNTER STOP switch to the OFF position.

59. Press the PROCEED button.

60. Press the SINGLE PULSE button.

61. Verify that the RG display is 0011 111 111 111 101.

62. Press the SINGLE PULSE button.

63. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

64. Press the NEGATIVE indicator switch to the off (extinguished) position.

65. Press the POSITIVE indicator switch to the on (illuminated) position.

66. Press the SINGLE PULSE button.

67. Verify that the RG display is 0011 111 111 111 101.

68. Press the SINGLE PULSE button twice.

69. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

70. Set the T12 COUNTER STOP switch to the ON position.

71. Set the INCREMENTS INHIBIT switch to the ON position.

72. Set the Agreement A switch to the OFF position.

73. Set the Y MARGINS switch to the NORM position.

CDU Y INPUT TEST

74. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

75. Press Keys CL, 00033, 37776.

76. Verify that the RZ display is 0000 000 000 011 011.

77. Verify that the REG SEL display is 0011 111 111 111 110.

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78. Press the EXECUTE button.

79. Verify that the LINC indicator is on.

80. Verify that the RG display is 0011 111 111 111 110.

81. Set the AGREEMENT A switches to XXXX 0033.

82. Press the MONITOR indicator switch to the on (illuminated) position.

83. Set the T12 COUNTER STOP switch to the OFF position.

84. Set the INCREMENTS INHIBIT switch to the OFF position.

85. Set the AGC INPUT COUNTERS switch to position 4.

86. Press the POSITIVE indicator switch to the on (illuminated) position.

87. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

88. Set the Agreement A switch to SAMPLE.

89. Press the PROCEED button.

90. Press the SINGLE PULSE button.

91. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

92. Press the SINGLE PULSE button.

93. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

94. Press the SINGLE PULSE button.

95. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

96. Press the POSITIVE indicator switch to the off (extinguished) position.

97. Press the NEGATIVE indicator switch to the on (illuminated) position.

98. Press the SINGLE PULSE button.

99. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

100. Press the SINGLE PULSE button twice.

101. Verify that the RG display is 0011 111 111 111 110.

102. Set the T12 COUNTER STOP switch to the ON position.

103. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

104. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

105. Press Keys CL, 00033, 37776.

106. Verify that the RZ display is 0000 000 000 011 011.

107. Verify that the REG SEL display is 0011 111 111 111 110.

108. Press the EXECUTE button.

109. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

110. Set the Y MARGINS switch to the V2 (High Zero) position.

111. Press the MONITOR indicator switch to the on (illuminated) position.

112. Press the NEGATIVE indicator switch to the off (extinguished) position.

113. Press the POSITIVE indicator switch to the on (illuminated) position.

114. Set the T12 COUNTER STOP switch to the OFF position.

115. Set the INCREMENTS INHIBIT switch to the OFF position.

116. Press the PROCEED button.

117. Press the SINGLE PULSE button.

118. Verify that the RG display is 0011 111 111 111 110.

119. Press the SINGLE PULSE button.

120. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

121. Press the POSITIVE indicator switch to the off (extinguished) position.

122. Press the NEGATIVE indicator switch to the on (illuminated) position.

123. Press the SINGLE PULSE button.

124. Verify that the RG display is 0011 111 111 111 110.

125. Press the SINGLE PULSE button twice.

126. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

127. Set the T12 COUNTER STOP switch to the ON position.

128. Set the Y MARGINS switch to the V3 (Low One) position.

129. Set the T12 COUNTER STOP switch to the OFF position.

130. Press the PROCEED button.

131. Press the SINGLE PULSE button.

132. Verify that the RG display is 0011 111 111 111 101.

133. Press the SINGLE PULSE button.

134. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

135. Press the NEGATIVE indicator switch to the off (extinguished) position.

136. Press the POSITIVE indicator switch to the on (illuminated) position.

137. Press the SINGLE PULSE button.

138. Verify that the RG display is 0011 111 111 111 101.

139. Press the SINGLE PULSE button twice.

140. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

141. Set the T12 COUNTER STOP switch to the ON position.

142. Set the INCREMENTS INHIBIT switch to the ON position.

143. Set the Agreement A switch to the OFF position.

144. Set the Y MARGINS switch to the NORM position.

CDU Z INPUT TEST

145. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

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146. Press Keys CL, 00034, 37776.

147. Verify that the RZ display is 0000 000 000 011 100.

148. Verify that the REG SEL display is 0011 111 111 111 110.

149. Press the EXECUTE button.

150. Verify that the LINC indicator is on.

151. Verify that the RG display is 0011 111 111 111 110.

152. Set the AGREEMENT A switches to XXXX 0034.

153. Press the MONITOR indicator switch to the on (illuminated) position.

154. Set the T12 COUNTER STOP switch to the OFF position.

155. Set the INCREMENTS INHIBIT switch to the OFF position.

156. Set the AGC INPUT COUNTERS switch to position 5.

157. Press the POSITIVE indicator switch to the on (illuminated) position.

158. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

159. Set the Agreement A switch to SAMPLE.

160. Press the PROCEED button.

161. Press the SINGLE PULSE button.

162. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

163. Press the SINGLE PULSE button.

164. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

165. Press the SINGLE PULSE button.

166. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

167. Press the POSITIVE indicator switch to the off (extinguished) position.

168. Press the NEGATIVE indicator switch to the on (illuminated) position.

169. Press the SINGLE PULSE button.

170. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

171. Press the SINGLE PULSE button twice.

172. Verify that the RG display is 0011 111 111 111 110.

173. Set the T12 COUNTER STOP switch to the ON position.

174. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

175. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

176. Press Keys CL, 00034, 37776.

177. Verify that the RZ display is 0000 000 000 011 100.

178. Verify that the REG SEL display is 0011 111 111 111 110.

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179. Press the EXECUTE button.

180. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

181. Set the Y MARGINS switch to the V2 (High Zero) position.

182. Press the MONITOR indicator switch to the on (illuminated) position.

183. Press the NEGATIVE indicator switch to the off (extinguished) position.

184. Press the POSITIVE indicator switch to the on (illuminated) position.

185. Set the T12 COUNTER STOP switch to the OFF position.

186. Set the INCREMENTS INHIBIT switch to the OFF position.

187. Press the PROCEED button.

188. Press the SINGLE PULSE button.

189. Verify that the RG display is 0011 111 111 111 110.

190. Press the SINGLE PULSE button.

191. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

192. Press the POSITIVE indicator switch to the off (extinguished) position.

193. Press the NEGATIVE indicator switch to the on (illuminated) position.

194. Press the SINGLE PULSE button.

195. Verify that the RG display is 0011 111 111 111 110.

196. Press the SINGLE PULSE button twice.

197. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

198. Set the T12 COUNTER STOP switch to the ON position.

199. Set the Y MARGINS switch to the V3 (Low One) position.

200. Set the T12 COUNTER STOP switch to the OFF position.

201. Press the PROCEED button.

202. Press the SINGLE PULSE button.

203. Verify that the RG display is 0011 111 111 111 101.

204. Press the SINGLE PULSE button.

205. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

206. Press the NEGATIVE indicator switch to the off (extinguished) position.

207. Press the POSITIVE indicator switch to the on (illuminated) position.

208. Press the SINGLE PULSE button.

209. Verify that the RG display is 0011 111 111 111 101.

210. Press the SINGLE PULSE button twice.

211. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

212. Set the T12 COUNTER STOP switch to the ON position.

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213. Set the INCREMENTS INHIBIT switch to the ON position.

214. Set the Agreement A switch to the OFF position.

215. Set the Y MARGINS switch to the NORM position.

CDU T INPUT TEST

216. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

217. Press Keys CL, 00035, 37776.

218. Verify that the RZ display is 0000 000 000 011 101.

219. Verify that the REG SEL display is 0011 111 111 111 110.

220. Press the EXECUTE button.

221. Verify that the LINC indicator is on.

222. Verify that the RG display is 0011 111 111 111 110.

223. Set the AGREEMENT A switches to XXXX 0035.

224. Press the MONITOR indicator switch to the on (illuminated) position.

225. Set the T12 COUNTER STOP switch to the OFF position.

226. Set the INCREMENTS INHIBIT switch to the OFF position.

227. Set the AGC INPUT COUNTERS switch to position 2.

228. Press the POSITIVE indicator switch to the on (illuminated) position.

229. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

230. Set the Agreement A switch to SAMPLE.

231. Press the PROCEED button.

232. Press the SINGLE PULSE button.

233. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

234. Press the SINGLE PULSE button.

235. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

236. Press the SINGLE PULSE button.

237. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

238. Press the POSITIVE indicator switch to the off (extinguished) position.

239. Press the NEGATIVE indicator switch to the on (illuminated) position.

240. Press the SINGLE PULSE button.

241. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

242. Press the SINGLE PULSE button twice.

243. Verify that the RG display is 0011 111 111 111 110.

244. Set the T12 COUNTER STOP switch to the ON position.

245. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

246. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

247. Press Keys CL, 00035, 37776.

248. Verify that the RZ display is 0000 000 000 011 101.

249. Verify that the REG SEL display is 0011 111 111 111 110.

250. Press the EXECUTE button.

251. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

252. Set the Y MARGINS switch to the V2 (High Zero) position.

253. Press the MONITOR indicator switch to the on (illuminated) position.

254. Press the NEGATIVE indicator switch to the off (extinguished) position.

255. Press the POSITIVE indicator switch to the on (illuminated) position.

256. Set the T12 COUNTER STOP switch to the OFF position.

257. Set the INCREMENTS INHIBIT switch to the OFF position.

258. Press the PROCEED button.

259. Press the SINGLE PULSE button.

260. Verify that the RG display is 0011 111 111 111 110.

261. Press the SINGLE PULSE button.

262. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

263. Press the POSITIVE indicator switch to the off (extinguished) position.

264. Press the NEGATIVE indicator switch to the on (illuminated) position.

265. Press the SINGLE PULSE button.

266. Verify that the RG display is 0011 111 111 111 110.

267. Press the SINGLE PULSE button twice.

268. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

269. Set the T12 COUNTER STOP switch to the ON position.

270. Set the Y MARGINS switch to the V3 (Low One) position.

271. Set the T12 COUNTER STOP switch to the OFF position.

272. Press the PROCEED button.

273. Press the SINGLE PULSE button.

274. Verify that the RG display is 0011 111 111 111 101.

275. Press the SINGLE PULSE button.

276. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

277. Press the NEGATIVE indicator switch to the off (extinguished) position.

278. Press the POSITIVE indicator switch to the on (illuminated) position.

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279. Press the SINGLE PULSE button.

280. Verify that the RG display is 0011 111 111 111 101.

281. Press the SINGLE PULSE button twice.

282. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

283. Set the T12 COUNTER STOP switch to the ON position.

284. Set the INCREMENTS INHIBIT switch to the ON position.

285. Set the Agreement A switch to the OFF position.

286. Set the Y MARGINS switch to the NORM position.

CDU S INPUT TEST

287. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

288. Press Keys CL, 0036, 37776.

289. Verify that the RZ display is 0000 000 000 011 110.

290. Verify that the REG SEL display is 0011 111 111 111 110.

291. Press the EXECUTE button.

292. Verify that the LINC indicator is on.

293. Verify that the RG display is 0011 111 111 111 110.

294. Set the AGREEMENT A switches to XXXX 0036.

295. Press the MONITOR indicator switch to the on (illuminated) position.

296. Set the T12 COUNTER STOP switch to the OFF position.

297. Set the INCREMENTS INHIBIT switch to the OFF position.

298. Set the AGC INPUT COUNTERS switch to position 1.

299. Press the POSITIVE indicator switch to the on (illuminated) position.

300. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

301. Set the Agreement A switch to SAMPLE.

302. Press the PROCEED button.

303. Press the SINGLE PULSE button.

304. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

305. Press the SINGLE PULSE button.

306. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

307. Press the SINGLE PULSE button.

308. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

309. Press the POSITIVE indicator switch to the off (extinguished) position.

310. Press the NEGATIVE indicator switch to the on (illuminated) position.

311. Press the SINGLE PULSE button.

312. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

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313. Press the SINGLE PULSE button twice.

314. Verify that the RG display is 0011 111 111 111 110.

315. Set the T12 COUNTER STOP switch to the ON position.

316. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

317. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

318. Press Keys CL, 00036, 37776.

319. Verify that the RZ display is 0000 000 000 011 110.

320. Verify that the REG SEL display is 0011 111 111 111 110.

321. Press the EXECUTE button.

322. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

323. Set the Y MARGINS switch to the V2 (High Zero) position.

324. Press the MONITOR indicator switch to the on (illuminated) position.

325. Press the NEGATIVE indicator switch to the off (extinguished) position.

326. Press the POSITIVE indicator switch to the on (illuminated) position.

327. Set the T12 COUNTER STOP switch to the OFF position.

328. Set the INCREMENTS INHIBIT switch to the OFF position.

329. Press the PROCEED button.

330. Press the SINGLE PULSE button.

331. Verify that the RG display is 0011 111 111 111 110.

332. Press the SINGLE PULSE button.

333. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

334. Press the POSITIVE indicator switch to the off (extinguished) position.

335. Press the NEGATIVE indicator switch to the on (illuminated) position.

336. Press the SINGLE PULSE button.

337. Verify that the RG display is 0011 111 111 111 110.

338. Press the SINGLE PULSE button twice.

339. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

340. Set the T12 COUNTER STOP switch to the ON position.

341. Set the Y MARGINS switch to the V3 (Low One) position.

342. Set the T12 COUNTER STOP switch to the OFF position.

343. Press the PROCEED button.

344. Press the SINGLE PULSE button.

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345. Verify that the RG display is 0011 111 111 111 101.

346. Press the SINGLE PULSE button.

347. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

348. Press the NEGATIVE indicator switch to the off (extinguished) position.

349. Press the POSITIVE indicator switch to the on (illuminated) position.

350. Press the SINGLE PULSE button.

351. Verify that the RG display is 0011 111 111 111 101.

352. Press the SINGLE PULSE button twice.

353. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

354. Set the T12 COUNTER STOP switch to the ON position.

355. Set the INCREMENTS INHIBIT switch to the ON position.

356. Set the Agreement A switch to the OFF position.

357. Set the Y MARGINS switch to the NORM position.

CDU X OUTPUT TEST

358. Verify that the STRT1/STRT2 switch on the Buffer Circuit Assembly is in the OFF position.

359. Press the LOAD CHAN S 510 OHMS indicator switch to the on (illuminated) position.

360. Set the FREQ + PHASE switch to the FRS S → T position.

361. Prepare the CTS FREQUENCY COUNTER for operation as specified in step 1 of JDC 05402.

> NOTE: During this test, the FREQUENCY COUNTER is to be operated as described under PROCEDURE on JDC 05402.

362. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

363. Press Keys CL, 00050, 77777.

364. Verify that the RZ display is 0000 000 000 101 000.

365. Verify that the REG SEL display is 0111 111 111 111 111.

366. Press the EXECUTE button.

367. Verify that the LINC indicator is on.

368. Press the READ AGC indicator switch to the on (illuminated) position.

369. Press Keys CL, 0050.

370. Verify that the RZ display is 0000 000 000 101 000.

371. Press the EXECUTE button.

372. Verify that the OINC indicator is on.

373. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

374. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

375. Press Keys CL, 00050, 52525.

376. Verify that the RZ display is 0000 000 000 101 000.

377. Verify that the REG SEL display is 0101 010 101 010 101.

378. Press the EXECUTE button.

379. Verify that the LINC indicator is on.

380. Press the READ AGC indicator switch to the on (illuminated) position.

381. Press Keys CL, 0050.

382. Verify that the RZ display is 0000 000 000 101 000.

383. Press the EXECUTE button.

384. Verify that the OINC indicator is on.

385. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

386. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

387. Press Keys CL, 00050, 00000.

388. Verify that the RZ display is 0000 000 000 101 000.

389. Verify that the REG SEL display is 0000 000 000 000 000.

390. Press the EXECUTE button.

391. Verify that the LINC indicator is on.

392. Press the READ AGC indicator switch to the on (illuminated) position.

393. Press Keys CL, 0050.

394. Verify that the RZ display is 0000 000 000 101 000.

395. Press the EXECUTE button.

396. Verify that the OINC indicator is on.

397. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

398. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

399. Press Keys CL, 00014, 40000.

400. Verify that the RZ display is 0000 000 000 001 100.

401. Verify that the REG SEL display is 0100 000 000 000 000.

402. Press the CHANNEL button.

403. Press the EXECUTE button.

404. Verify that the LINC indicator is on.

405. Press Keys CL, 00050, 02000.

406. Verify that the RZ display is 0000 000 000 101 000.

407. Verify that the REG SEL display is 0000 010 000 000 000.

408. Press the EXECUTE button.

409. Set the CHANNEL 8 switches to the 201 position.

410. Set the INHIBIT INTERRUPT switch to the OFF position.

411. Press the MONITOR indicator switch to the on (illuminated) position, and set the AGC INPUT COUNTER switch to position 3.

position 3.

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412. Set the INCREMENTS INHIBIT switch to the OFF position.

413. Set the T12 COUNTER STOP switch to the OFF position.

414. Press the RESET button on the FREQUENCY COUNTER.

415. Press the PROCEED button.

416. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

417. Set the T12 COUNTER STOP switch to the ON position.

418. Set the INCREMENTS INHIBIT switch to the ON position.

419. Set the INHIBIT INTERRUPT switch to the ON position.

420. Press the READ AGC indicator switch to the on (illuminated) position.

421. Press Keys CL, 0014.

422. Verify that the RZ display is 0000 000 000 001 100.

423. Press the CHANNEL button.

424. Press the EXECUTE button.

425. Verify that the OINC indicator is on.

426. Verify that BIT 16 of the REG SEL display is a "0". Stamp data sheet.

427. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

428. Press Keys CL, 00014, 40000.

429. Verify that the RZ display is 0000 000 000 001 100.

430. Verify that the REG SEL display is 0100 000 000 000 000.

431. Press the CHANNEL button.

432. Press the EXECUTE button.

433. Verify that the LINC indicator is on.

434. Press Keys CL, 00050, 75777.

435. Verify that the RZ display is 0000 000 000 101 000.

436. Verify that the REG SEL display is 0111 101 111 111 111.

437. Press the EXECUTE button.

438. Set the CHANNEL 8 switches to the 202 position.

439. Press the MONITOR indicator switch to the on (illuminated) position.

440. Set the INCREMENTS INHIBIT switch to the OFF position.

441. Set the INHIBIT INTERRUPT switch to the OFF position.

442. Set the T12 COUNTER STOP switch to the OFF position.

443. Press the RESET button on the FREQUENCY COUNTER.

444. Press the PROCEED button.

445. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

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446. Set the T12 COUNTER STOP switch to the ON position.

447. Set the INCREMENTS INHIBIT switch to the ON position.

448. Set the INHIBIT INTERRUPT switch to the ON position.

449. Press the READ AGC indicator switch to the on (illuminated) position.

450. Press Keys CL, 0014.

451. Verify that the RZ display is 0000 000 000 001 100.

452. Press the CHANNEL button.

453. Press the EXECUTE button.

454. Verify that the OINC indicator is on.

455. Verify that BIT 16 of the REG SEL display is a "0". Stamp data sheet.

CDU Y OUTPUT TEST

456. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

457. Press Keys CL, 00051, 77777.

458. Verify that the RZ display is 0000 000 000 101 001.

459. Verify that the REG SEL display is 0111 111 111 111 111.

460. Press the EXECUTE button.

461. Verify that the LINC indicator is on.

462. Press the READ AGC indicator switch to the on (illuminated) position.

463. Press Keys CL, 0051.

464. Verify that the RZ display is 0000 000 000 101 001.

465. Press the EXECUTE button.

466. Verify that the OINC indicator is on.

467. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

468. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

469. Press Keys CL, 00051, 52525.

470. Verify that the RZ display is 0000 000 000 101 001.

471. Verify that the REG SEL display is 0101 010 101 010 101.

472. Press the EXECUTE button.

473. Verify that the LINC indicator is on.

474. Press the READ AGC indicator switch to the on (illuminated) position.

475. Press Keys CL, 0051.

476. Verify that the RZ display is 0000 000 000 101 001.

477. Press the EXECUTE button.

478. Verify that the OINC indicator is on.

479. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

480. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

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481. Press Keys CL, 00051 00000.

482. Verify that the RZ display is 0000 000 000 101 001.

483. Verify that the REG SEL display is 0000 000 000 000 000.

484. Press the EXECUTE button.

485. Verify that the LINC indicator is on.

486. Press the READ AGC indicator switch to the on (illuminated) position.

487. Press Keys CL, 0051.

488. Verify that the RZ display is 0000 000 000 101 001.

489. Press the EXECUTE button.

490. Verify that the OINC indicator is on.

491. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

492. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

493. Press Keys CL, 00014, 20000.

494. Verify that the RZ display is 0000 000 000 001 100.

495. Verify that the REG SEL display is 0010 000 000 000 000.

496. Press the CHANNEL button.

497. Press the EXECUTE button.

498. Verify that the LINC indicator is on.

499. Press Keys CL, 00051, 02000.

500. Verify that the RZ display is 0000 000 000 101 001.

501. Verify that the REG SEL display is 0000 010 000 000 000.

502. Press the EXECUTE button.

503. Set the CHANNEL 8 switches to the 203 position.

504. Set the INHIBIT INTERRUPT switch to the OFF position.

505. Press the MONITOR indicator switch to the on (illuminated) position.

506. Set the INCREMENTS INHIBIT switch to the OFF position.

507. Set the T12 COUNTER STOP switch to the OFF position and set the AGC INPUT COUNTER switch to position 4.

508. Press the RESET button on the FREQUENCY COUNTER.

509. Press the PROCEED button.

510. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

511. Set the T12 COUNTER STOP switch to the ON position.

512. Set the INCREMENTS INHIBIT switch to the ON position.

513. Set the INHIBIT INTERRUPT switch to the ON position.

514. Press the READ AGC indicator switch to the on (illuminated) position.

515. Press Keys CL, 0014.

516. Verify that the RZ display is 0000 000 000 001 100.

517. Press the CHANNEL button.

518. Press the EXECUTE button.

519. Verify that the OINC indicator is on.

520. Verify that BIT 14 of the REG SEL display is a "0". Stamp data sheet.

521. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

522. Press Keys CL, 00014, 20000.

523. Verify that the RZ display is 0000 000 000 001 100.

524. Verify that the REG SEL display is 0010 000 000 000 000.

525. Press the CHANNEL button.

526. Press the EXECUTE button.

527. Verify that the LINC indicator is on.

528. Press Keys CL, 00051, 75777.

529. Verify that the RZ display is 0000 000 000 101 001.

530. Verify that the REG SEL display is 0111 101 111 111 111.

531. Press the EXECUTE button.

532. Set the CHANNEL S switches to the 204 position.

533. Press the MONITOR indicator switch to the on (illuminated) position.

534. Set the INCREMENTS INHIBIT switch to the OFF position.

535. Set the INHIBIT INTERRUPT switch to the OFF position.

536. Set the T12 COUNTER STOP switch to the OFF position.

537. Press the RESET button on the FREQUENCY COUNTER.

538. Press the PROCEED button.

539. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

540. Set the T12 COUNTER STOP switch to the ON position.

541. Set the INCREMENTS INHIBIT switch to the ON position.

542. Set the INHIBIT INTERRUPT switch to the ON position.

543. Press the READ AGC indicator switch to the on (illuminated) position.

544. Press Keys CL, 0014.

545. Verify that the RZ display is 0000 000 000 001 100.

546. Press the CHANNEL button.

547. Press the EXECUTE button.

548. Verify that the OINC indicator is on.

549. Verify that BIT 14 of the REG SEL display is a "0". Stamp data sheet.

CDU Z OUTPUT TEST

550. Set the AGC INPUT COUNTERS switch to position 5, and press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

551. Press Keys CL, 00052, 77777.

S.S. the AGC INPUT [illegible] 5)
switch to position 5, [illegible]

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552. Verify that the RZ display is 0000 000 000 101 010.

553. Verify that the REG SEL display is 0111 111 111 111 111.

554. Press the EXECUTE button.

555. Verify that the LINC indicator is on.

556. Press the READ AGC indicator switch to the on (illuminated) position.

557. Press Keys CL, 0052.

558. Verify that the RZ display is 0000 000 000 101 010.

559. Press the EXECUTE button.

560. Verify that the OINC indicator is on.

561. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

562. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

563. Press Keys CL, 00052, 52525.

564. Verify that the RZ display is 0000 000 000 101 010.

565. Verify that the REG SEL display is 0101 010 101 010 101.

566. Press the EXECUTE button.

567. Verify that the LINC indicator is on.

568. Press the READ AGC indicator switch to the on (illuminated) position.

569. Press Keys CL, 0052.

570. Verify that the RZ display is 0000 000 000 101 010.

571. Press the EXECUTE button.

572. Verify that the OINC indicator is on.

573. Verify that the REG SEL display is 1001 010 101 010 101. Stamp data sheet.

574. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

575. Press Keys CL, 00052, 00000.

576. Verify that the RZ display is 0000 000 000 101 010.

577. Verify that the REG SEL display is 0000 000 000 000 000.

578. Press the EXECUTE button.

579. Verify that the LINC indicator is on.

580. Press the READ AGC indicator switch to the on (illuminated) position.

581. Press Keys CL, 0052.

582. Verify that the RZ display is 0000 000 000 101 010.

583. Press the EXECUTE button.

584. Verify that the OINC indicator is on.

585. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

586. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

587. Press Keys CL, 00014, 10000.

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588. Verify that the RZ display is 0000 000 000 001 100.

589. Verify that the REG SEL display is 0001 000 000 000 000.

590. Press the CHANNEL button.

591. Press the EXECUTE button.

592. Verify that the LINC indicator is on.

593. Press Keys CL, 00052, 62000.

594. Verify that the RZ display is 0000 000 000 101 010.

595. Verify that the REG SEL display is 0000 010 000 000 000.

596. Press the EXECUTE button.

597. Set the CHANNEL S switches to the 206 position.

598. Set the INHIBIT INTERRUPT switch to the OFF position.

599. Press the MONITOR indicator switch to the on (illuminated) position.

600. Set the INCREMENTS INHIBIT switch to the OFF position.

601. Set the T12 COUNTER STOP switch to the OFF position.

602. Press the RESET button on the FREQUENCY COUNTER.

603. Press the PROCEED button.

604. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

605. Set the T12 COUNTER STOP switch to the ON position.

606. Set the INCREMENTS INHIBIT switch to the ON position.

607. Set the INHIBIT INTERRUPT switch to the ON position.

608. Press the READ AGC indicator switch to the on (illuminated) position.

609. Press Keys CL, 0014.

610. Verify that the RZ display is 0000 000 000 001 100.

611. Press the CHANNEL button.

612. Press the EXECUTE button.

613. Verify that the OINC indicator is on.

614. Verify that BIT 13 of the REG SEL display is a "0". Stamp data sheet.

615. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

616. Press Keys CL, 00014, 10000

617. Verify that the RZ display is 0000 000 000 001 100.

618. Verify that the REG SEL display is 0001 000 000 000 000.

619. Press the CHANNEL button.

620. Press the EXECUTE button.

621. Verify that the LINC indicator is on.

622. Press Keys CL, 00052, 75777.

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623. Verify that the RZ display is 0000 000 000 101 010.

624. Verify that the REG SEL display is 0111 101 111 111 111.

625. Press the EXECUTE button.

626. Set the CHANNEL S switches to the 206 position.

627. Press the MONITOR indicator switch to the on (illuminated) position.

628. Set the INCREMENTS INHIBIT switch to the OFF position.

629. Set the INHIBIT INTERRUPT switch to the OFF position.

630. Set the T12 COUNTER STOP switch to the OFF position.

631. Press the RESET button on the FREQUENCY COUNTER.

632. Press the PROCEED button.

633. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

634. Set the T12 COUNTER STOP switch to the ON position.

635. Set the INCREMENTS INHIBIT switch to the ON position.

636. Set the INHIBIT INTERRUPT switch to the ON position.

637. Press the READ AGC indicator switch to the on (illuminated) position.

638. Press Keys CL, 0014.

639. Verify that the RZ display is 0000 000 000 001 100.

640. Press the CHANNEL button.

641. Press the EXECUTE button.

642. Verify that the OINC indicator is on.

643. Verify that BIT 13 of the REG SEL display is a "0". Stamp data sheet.

CDU T OUTPUT TEST

644. Set the CHANNEL S switches to position 101.

645. Press the LOAD CHAN T 510 OHMS switch to the on (illuminated) position.

646. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

647. Press Keys CL, 00053, 77777.

648. Verify that the RZ display is 0000 000 000 101 011.

649. Verify that the REG SEL display is 0111 111 111 111 111.

650. Press the EXECUTE button.

651. Verify that the LINC indicator is on.

652. Press the READ AGC indicator switch to the on (illuminated) position.

653. Press Keys CL, 0053.

654. Verify that the RZ display is 0000 000 000 101 011.

655. Press the EXECUTE button.

656. Verify that the OINC indicator is on.

657. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

658. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

659. Press Keys CL, 00053, 52525.

660. Verify that the RZ display is 0000 000 000 101 011.

661. Verify that the REG SEL display is 0101 010 101 010 101.

662. Press the EXECUTE button.

663. Verify that the LINC indicator is on.

664. Press the READ AGC indicator switch to the on (illuminated) position.

665. Press Keys CL, 0053.

666. Verify that the RZ display is 0000 000 000 101 011.

667. Press the EXECUTE button.

668. Verify that the OINC indicator is on.

669. Verify that the REG SEL display is 1001 010 101 010 101. Stamp data sheet.

670. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

671. Press Keys CL, 00053, 00000.

672. Verify that the RZ display is 0000 000 000 101 011.

673. Verify that the REG SEL display is 0000 000 000 000 000.

674. Press the EXECUTE button.

675. Verify that the LINC indicator is on.

676. Press the READ AGC indicator switch to the on (illuminated) position.

677. Press Keys CL, 0053.

678. Verify that the RZ display is 0000 000 000 101 011.

679. Press the EXECUTE button.

680. Verify that the OINC indicator is on.

681. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

682. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

683. Press Keys CL, 00014, 04000.

684. Verify that the RZ display is 0000 000 000 001 100.

685. Verify that the REG SEL display is 0000 100 000 000 000.

686. Press the CHANNEL button.

687. Press the EXECUTE button.

688. Verify that the LINC indicator is on.

689. Press Keys CL, 00053, 02000.

690. Verify that the RZ display is 0000 000 000 101 011.

691. Verify that the REG SEL display is 0000 010 000 000 000.

692. Press the EXECUTE button.

693. Set the CHANNEL T switches to the 203 position.

694. Set the FREQ+ PHASE switch to the FRT T → S position.

695. Set the INHIBIT INTERRUPT switch to the OFF position.

696. Press the MONITOR indicator switch to the on (illuminated) position.

697. Set the AGC INPUT COUNTERS switch to position 2.

698. Set the INCREMENTS INHIBIT switch to the OFF position.

699. Set the T12 COUNTER STOP switch to the OFF position.

700. Press the RESET button on the FREQUENCY COUNTER.

701. Press the PROCEED button.

702. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

703. Set the T12 COUNTER STOP switch to the ON position.

704. Set the INCREMENTS INHIBIT switch to the ON position.

705. Set the INHIBIT INTERRUPT switch to the ON position.

706. Press the READ AGC indicator switch to the on (illuminated) position.

707. Press Keys CL, 0014.

708. Verify that the RZ display is 0000 000 000 001 100.

709. Press the CHANNEL button.

710. Press the EXECUTE button.

711. Verify that the OINC indicator is on.

712. Verify that BIT 12 of the REG SEL display is a "0". Stamp data sheet.

713. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

714. Press Keys CL, 00014, 04000.

715. Verify that the RZ display is 0000 000 000 001 100.

716. Verify that the REG SEL display is 0000 100 000 000 000.

717. Press the CHANNEL button.

718. Press the EXECUTE button.

719. Verify that the LINC indicator is on.

720. Press Keys CL, 00053, 75777.

721. Verify that the RZ display is 0000 000 000 101 011.

722. Verify that the REG SEL display is 0111 101 111 111 111.

723. Press the EXECUTE button.

724. Set the CHANNEL T switches to the 204 position.

725. Press the POSITIVE indicator switch to the off position, and press the NEGATIVE indicator switch to the on (illuminated) position.

726. Press the MONITOR indicator switch to the on (illuminated) position.

727. Set the INCREMENTS INHIBIT switch to the OFF position.

728. Set the INHIBIT INTERRUPT switch to the OFF position.

729. Set the T12 COUNTER STOP switch to the OFF position.

730. Press the RESET button on the FREQUENCY COUNTER.

731. Press the PROCEED button.

732. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

733. Set the T12 COUNTER STOP switch to the ON position.

734. Set the INCREMENTS INHIBIT switch to the ON position.

735. Set the INHIBIT INTERRUPT switch to the ON position.

736. Press the READ AGC indicator switch to the on (illuminated) position.

737. Press Keys CL, 0014.

738. Verify that the RZ display is 0000 000 000 001 100.

739. Press the CHANNEL button.

740. Press the EXECUTE button.

741. Verify that the OINC indicator is on.

742. Verify that BIT 12 of the REG SEL display is a "0". Stamp data sheet.

CDU S OUTPUT TEST

743. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

744. Press Keys CL, 00054, 77777.

745. Verify that the RZ display is 0000 000 000 101 100.

746. Verify that the REG SEL display is 0111 111 111 111 111.

747. Press the EXECUTE button.

748. Verify that the LINC indicator is on.

749. Press the READ AGC indicator switch to the on (illuminated) position.

750. Press Keys CL, 0054.

751. Verify that the RZ display is 0000 000 000 101 100.

752. Press the EXECUTE button.

753. Verify that the OINC indicator is on.

754. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

755. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

756. Press Keys CL, 00054, 52525.

757. Verify that the RZ display is 0000 000 000 101 100.

758. Verify that the REG SEL display is 0101 010 101 010 101.

759. Press the EXECUTE button.

760. Verify that the LINC indicator is on.

761. Press the READ AGC indicator switch to the on (illuminated) position.

762. Press Keys CL, 0054.

763. Verify that the RZ display is 0000 000 000 101 100.

764. Press the EXECUTE button.

765. Verify that the OINC indicator is on.

766. Verify that the REG SEL display is 1001 010 101 010 101. Stamp data sheet.

767. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

768. Press Keys CL, 00054, 00000.

769. Verify that the RZ display is 0000 000 000 101 100.

770. Verify that the REG SEL display is 0000 000 000 000 000.

771. Press the EXECUTE button.

772. Verify that the LINC indicator is on.

773. Press the READ AGC indicator switch to the on (illuminated) position.

774. Press Keys CL, 0054.

775. Verify that the RZ display is 0000 000 000 101 100.

776. Press the EXECUTE button.

777. Verify that the OINC indicator is on.

778. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

779. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

780. Set the AGC INPUT COUNTER switch to position 1.

781. Press Keys CL, 00014, 02000.

782. Verify that the RZ display is 0000 000 000 001 100.

783. Verify that the REG SEL display is 0000 010 000 000 000.

784. Press the CHANNEL button.

785. Press the EXECUTE button.

786. Verify that the LINC indicator is on.

787. Press Keys CL, 00054, 02000.

788. Verify that the RZ display is 0000 000 000 101 100.

789. Verify that the REG SEL display is 0000 010 000 000 000.

790. Press the EXECUTE button.

791. Set the CHANNEL T switches to the 201 position.

792. Set the INHIBIT INTERRUPT switch to the OFF position.

793. Press the MONITOR indicator switch to the on (illuminated) position.

794. Set the INCREMENTS INHIBIT switch to the OFF position.

795. Set the T12 COUNTER STOP switch to the OFF position.

796. Press the NEGATIVE indicator switch to the off position, and press the POSITIVE indicator switch to the on position.

797. Press the RESET button on the FREQUENCY COUNTER.

798. Press the PROCEED button.

799. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

800. Set the T12 COUNTER STOP switch to the ON position.

801. Set the INCREMENTS INHIBIT switch to the ON position.

802. Set the INHIBIT INTERRUPT switch to the ON position.

803. Press the READ AGC indicator switch to the on (illuminated) position.

804. Press Keys CL, 0014.

805. Verify that the RZ display is 0000 000 000 001 100.

806. Press the CHANNEL button.

807. Press the EXECUTE button.

808. Verify that the OINC indicator is on.

809. Verify that BIT 11 of the REG SEL display is a "0". Stamp data sheet.

810. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

811. Press Keys CL, 0014, 02000.

812. Verify that the RZ display is 0000 000 000 001 100.

813. Verify that the REG SEL display is 0000 010 000 000 000.

814. Press the CHANNEL button.

815. Press the EXECUTE button.

816. Verify that the LINC indicator is on.

817. Press Keys CL, 00054, 75777.

818. Verify that the RZ display is 0000 000 000 101 100.

819. Verify that the REG SEL display is 0111 101 111 111 111.

820. Press the EXECUTE button.

821. Set the CHANNEL T switches to the 202 position.

822. Press the MONITOR indicator switch to the on (illuminated) position.

823. Set the AGC INPUT COUNTERS to position 1.

824. Press the NEGATIVE indicator switch to the on position (illuminated), and press the POSITIVE indicator switch to the off position (not illuminated).

825. Set the INCREMENTS INHIBIT switch to the OFF position.

826. Set the INHIBIT INTERRUPT switch to the OFF position.

827. Set the T12 COUNTER STOP switch to the OFF position.

828. Press the RESET button on the FREQUENCY COUNTER.

829. Press the PROCEED button.

830. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

831. Set the T12 COUNTER STOP switch to the ON position.

832. Set the INCREMENTS INHIBIT switch to the ON position.

833. Set the INHIBIT INTERRUPT switch to the ON position.

834. Press the READ AGC indicator switch to the on (illuminated) position.

835. Press Keys CL, 0014.

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836. Verify that the RZ display is 0000 000 000 001 100.

837. Press the CHANNEL button.

838. Press the EXECUTE button.

839. Verify that the OINC indicator is on.

840. Verify that BIT 11 of the REG SEL display is a "0". Stamp data sheet.

841. Set the CHANNEL T switches to position 101.

842. Set the FREQ + PHASE switch to the FRS S → T position.

CDU-X

843. Set the AGC INPUT COUNTERS switch to position 3.

844. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

845. Press Keys CL, 00014, 40000.

846. Verify that the RZ display is 0000 000 000 001 100.

847. Verify that the REG SEL display is 0100 000 000 000 000.

848. Press the CHANNEL button.

849. Press the EXECUTE button.

850. Verify that the LINC indicator is on.

851. Press Keys CL, 00050, 75777.

852. Verify that the RZ display is 0000 000 000 101 000.

853. Verify that the REG SEL display is 0111 101 111 111 111.

854. Press the EXECUTE button.

855. Set the CHANNEL S switches to the 202 position.

856. Press the MONITOR indicator switch to the on (illuminated) position.

857. Set the INCREMENTS INHIBIT switch to the OFF position.

858. Set the INHIBIT INTERRUPT switch to the OFF position.

859. Set the T12 COUNTER STOP switch to the OFF position.

860. Press the RESET button on the FREQUENCY COUNTER.

861. Press the PROCEED button.

862. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

863. Set the T12 COUNTER STOP switch to the ON position.

864. Set the INCREMENTS INHIBIT switch to the ON position.

865. Set the INHIBIT INTERRUPT switch to the ON position.

866. Press the READ AGC indicator switch to the on (illuminated) position.

867. Press Keys CL, 0014.

868. Verify that the RZ display is 0000 000 000 001 100.

869. Press the CHANNEL button.

870. Press the EXECUTE button.

27

871. Verify that the OINC incidator is on.

872. Verify that BIT 15 of the REG SEL display is a "0". Stamp data sheet.

CDU-Y

873. Set the AGC INPUT COUNTERS switch to position 4.

874. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

875. Press Keys CL, 00014, 20000.

876. Verify that the RZ display is 0000 000 000 001 100.

877. Verify that the REG SEL display is 0010 000 000 000 000.

878. Press the CHANNEL button.

879. Press the EXECUTE button.

880. Verify that the LINC indicator is on.

881. Press Keys CL, 00051, 75777.

882. Verify that the RZ display is 0000 000 000 101 001.

883. Verify that the REG SEL display is 0111 101 111 111 111.

884. Press the EXECUTE button.

885. Set the CHANNEL S switches to the 204 position.

886. Press the MONITOR indicator switch to the on (illuminated) position.

887. Set the INCREMENTS INHIBIT switch to the OFF position.

888. Set the INHIBIT INTERRUPT switch to the OFF position.

889. Set the T12 COUNTER STOP switch to the OFF position.

890. Press the RESET button on the FREQUENCY COUNTER.

891. Press the PROCEED button.

892. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

893. Set the T12 COUNTER STOP switch to the ON position.

894. Set the INCREMENTS INHIBIT switch to the ON position.

895. Set the INHIBIT INTERRUPT switch to the ON position.

896. Press the READ AGC indicator switch to the on (illuminated) position.

897. Press Keys CL, 0014.

898. Verify that the RZ display is 0000 000 000 001 100.

899. Press the CHANNEL button.

900. Press the EXECUTE button.

901. Verify that the OINC indicator is on.

902. Verify that BIT 14 of the REG SEL display is a "0". Stamp data sheet.

CDU-Z

903. Set the AGC INPUT COUNTERS switch to position 5.

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904. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

905. Press Keys CL, 0014, 10000.

906. Verify that the RZ display is 0000 000 000 001 100.

907. Verify that the REG SEL display is 0001 000 000 000 000.

908. Press the CHANNEL button.

909. Press the EXECUTE button.

910. Verify that the LINC indicator is on.

911. Press Keys CL, 00052, 75777.

912. Verify that the RZ display is 0000 000 000 101 010.

913. Verify that the REG SEL display is 0111 101 111 111 111.

914. Press the EXECUTE button.

915. Set the CHANNEL S switches to the 206 position.

916. Press the MONITOR indicator switch to the on (illuminated) position.

917. Set the INCREMENTS INHIBIT switch to the OFF position.

918. Set the INHIBIT INTERRUPT switch to the OFF position.

919. Set the T12 COUNTER STOP switch to the OFF position.

920. Press the RESET button on the FREQUENCY COUNTER.

921. Press the PROCEED button.

922. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

923. Set the T12 COUNTER STOP switch to the ON position.

924. Set the INCREMENTS INHIBIT switch to the ON position.

925. Set the INHIBIT INTERRUPT switch to the ON position.

926. Press the READ AGC indicator switch to the on (illuminated) position.

927. Press Keys CL, 0014.

928. Verify that the RZ display is 0000 000 000 001 100.

929. Press the CHANNEL button.

930. Press the EXECUTE button.

931. Verify that the OINC indicator is on.

932. Verify that BIT 13 of the REG SEL display is a "0". Stamp data sheet.

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EQUIPMENT TEST 5
DATA SHEET 1 OF 5

JDC
NO. 05788
REV. A
INITIAL TDRR 31464

JOB CDU COUNTERS TEST

ASSEMBLY UNDER TEST	TEST HISTORY
TITLE ______	DATE ______ START ______ END ______ SITE / LOCATION
SER. NO. ______ DWG ______ REV. ______	TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION   APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
20.	RG Indication	0011 111 111 111 111	
22.	RG Indication	1100 000 000 000 000	
24.	RG Indication	1100 000 000 000 001	
28.	RG Indication	1100 000 000 000 000	
49.	RG Indication	0011 111 111 111 110	
55.	RG Indication	0011 111 111 111 110	
63.	RG Indication	0011 111 111 111 100	
69.	RG Indication	0011 111 111 111 111	
91.	RG Indication	0011 111 111 111 111	
93.	RG Indication	1100 000 000 000 000	
95.	RG Indication	1100 000 000 000 001	
99.	RG Indication	1100 000 000 000 000	
120.	RG Indication	0011 111 111 111 110	
126.	RG Indication	0011 111 111 111 110	
134.	RG Indication	0011 111 111 111 100	

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EQUIPMENT TEST 5
DATA SHEET 2 OF 5

JDC
NO. 05788
REV. A

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
140.	RG Indication	0011 111 111 111 111	
162.	RG Indication	0011 111 111 111 111	
164.	RG Indication	1100 000 000 000 000	
166.	RG Indication	1100 000 000 000 001	
170.	RG Indication	1100 000 000 000 000	
191.	RG Indication	0011 111 111 111 110	
197.	RG Indication	0011 111 111 111 110	
205.	RG Indication	0011 111 111 111 100	
211.	RG Indication	0011 111 111 111 111	
233.	RG Indication	0011 111 111 111 111	
235.	RG Indication	1100 000 000 000 000	
237.	RG Indication	1100 000 000 000 001	
241.	RG Indication	1100 000 000 000 000	
262.	RG Indication	0011 111 111 111 110	
268.	RG Indication	0011 111 111 111 110	
276.	RG Indication	0011 111 111 111 100	
282.	RG Indication	0011 111 111 111 111	
304.	RG Indication	0011 111 111 111 111	
306.	RG Indication	1100 000 000 000 000	
308.	RG Indication	1100 000 000 000 001	
312.	RG Indication	1100 000 000 000 000	
333.	RG Indication	0011 111 111 111 110	

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EQUIPMENT TEST 5
DATA SHEET 3 OF 5

JDC
NO. 05788
REV. A

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
339.	RG Indication	0011 111 111 111 110	
347.	RG Indication	0011 111 111 111 100	
353.	RG Indication	0011 111 111 111 111	
373.	REG SEL Indication	1111 111 111 111 111	
385.	REG SEL Indication	1101 010 101 010 101	
397.	REG SEL Indication	0000 000 000 000 000	
416.	FREQUENCY COUNTER Display	1024	
426.	REG SEL Indication	BIT 16 is a "0"	
445.	FREQUENCY COUNTER Display	1024	
455.	REG SEL Indication	BIT 16 is a "0"	
467.	REG SEL Indication	1111 111 111 111 111	
479.	REG SEL Indication	1101 010 101 010 101	
491.	REG SEL Indication	0000 000 000 000 000	
510.	FREQUENCY COUNTER Display	1024	
520.	REG SEL Indication	BIT 14 is a "0"	
539.	FREQUENCY COUNTER Display	1024	
549.	REG SEL Indication	BIT 14 is a "0"	
561.	REG SEL Indication	1111 111 111 111 111	
573.	REG SEL Indication	1001 010 101 010 101	
585.	REG SEL Indication	0000 000 000 000 000	

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EQUIPMENT TEST
DATA SHEET 4 OF 5

JDC
NO. 05788
REV. A

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
604.	FREQUENCY COUNTER Display	1024	
614.	REG SEL Indication	BIT 13 is a "0"	
633.	FREQUENCY COUNTER Display	1024	
643.	REG SEL Indication	BIT 13 is a "0"	
657.	REG SEL Indication	1111 111 111 111 111	
669.	REG SEL Indication	1001 010 101 010 101	
681.	REG SEL Indication	0000 000 000 000 000	
702.	FREQUENCY COUNTER Display	1024	
712.	REG SEL Indication	BIT 12 is a "0"	
732.	FREQUENCY COUNTER Display	1024	
742.	REG SEL Indication	BIT 12 is a "0"	
754.	REG SEL Indication	1111 111 111 111 111	
766.	REG SEL Indication	1001 010 101 010 101	
778.	REG SEL Indication	0000 000 000 000 000	
799.	FREQUENCY COUNTER Display	1024	
809.	REG SEL Indication	BIT 11 is a "0"	
830.	FREQUENCY COUNTER Display	1024	
840.	REG SEL Indication	BIT 11 is a "0"	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 5

JDC
NO. 05788
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JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
862.	FREQUENCY COUNTER Display	1024	
872.	REG SEL Indication	BIT 15 is a "0"	
892.	FREQUENCY COUNTER Display	1024	
902.	REG SEL Indication	BIT 14 is a "0"	
922.	FREQUENCY COUNTER Display	1024	
932.	REG SEL Indication	BIT 13 is a "0"	

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RAYTHEON

JDC 05788 REV. B PAGE 1 OF 28
INITIAL TDRR 35464 D.S. PGS 5

JOB CDU COUNTERS TEST

SUBSYSTEM Computer

ASSY. Block II C-Computer

DESCRIPTION

Tests the operation of the CDU input-output counters, and associated interface circuitry under normal and marginal input conditions.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	8-6-68	36667	19, 26	-	EA	-
B	10-17-68	36909	18, 21, 24, 25, 28	3, 4	EA	-

REFERENCES
JDC's 05402, 05413, 05414, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set-up as specified in JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the XY Interface panel of the CTS.

CDU X INPUT TEST

3. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

4. Press Keys CL, 00032, 37776.

5. Verify that the RZ display is 0000 000 000 011 010.

6. Verify that the REG SEL display is 0011 111 111 111 110.

7. Press the EXECUTE button.

8. Verify that the LINC indicator is on.

9. Verify that the RG display is 0011 111 111 111 110.

10. Set the AGREEMENT A switches to XXXX 0032.

11. Press the MONITOR indicator switch to the on (illuminated) position.

12. Set the T12 COUNTER STOP switch to the OFF position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 18 JAN 68

JOB CDU COUNTERS TEST JDC 05788 REV B PAGE 2 OF 28

SUBSYSTEM Computer ASSY Block II C-Computer

13. Set the INCREMENTS INHIBIT switch to the OFF position.

14. Set the AGC INPUT COUNTERS switch to position 3.

15. Press the POSITIVE indicator switch to the on (illuminated) position.

16. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

17. Set the Agreement A switch to SAMPLE.

18. Press the PROCEED button.

19. Press the SINGLE PULSE button.

20. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

21. Press the SINGLE PULSE button.

22. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

23. Press the SINGLE PULSE button.

24. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

25. Press the POSITIVE indicator switch to the off (extinguished) position.

26. Press the NEGATIVE indication switch to the on (illuminated) position.

27. Press the SINGLE PULSE button.

28. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

29. Press the SINGLE PULSE button twice.

30. Verify that the RG display is 0011 111 111 111 110.

31. Set the T12 COUNTER STOP switch to the ON position.

32. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

33. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

34. Press Keys CL, 00032, 37776.

35. Verify that the RZ display is 0000 000 000 011 010.

36. Verify that the REG SEL display is 0011 111 111 111 110.

37. Press the EXECUTE button.

38. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

39. Set the Y MARGINS switch to the V2 (High Zero) position.

40. Press the MONITOR indicator switch to the on (illuminated) position.

41. Press the NEGATIVE indicator switch to the off (extinguished) position.

42. Press the POSITIVE indicator switch to the on (illuminated) position.

43. Set the T12 COUNTER STOP switch to the OFF position.

44. Set the INCREMENTS INHIBIT switch to the OFF position.

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JOB CDU COUNTERS TEST JDC 05788 REV B PAGE 3 OF 28

SUBSYSTEM Computer ASSY Block II C-Computer

45. Press the PROCEED button.

46. Press the SINGLE PULSE button.

47. Verify that the RG display is 0011 111 111 111 110.

48. Press the SINGLE PULSE button.

49. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

50. Press the POSITIVE indicator switch to the off (extinguished) position.

51. Press the NEGATIVE indicator switch to the on (illuminated) position.

52. Press the SINGLE PULSE button.

53. Verify that the RG display is 0011 111 111 111 110.

54. Press the SINGLE PULSE button twice.

55. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

56. Set the T12 COUNTER STOP switch to the ON position.

57. Set the Y MARGINS switch to the V3 (Low One) position.

58. Set the T12 COUNTER STOP switch to the OFF position.

59. Press the PROCEED button.

60. Press the SINGLE PULSE button.

61. Verify that the RG display is 0011 111 111 111 101.

62. Press the SINGLE PULSE button.

63. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

64. Press the NEGATIVE indicator switch to the off (extinguished) position.

65. Press the POSITIVE indicator switch to the on (illuminated) position.

66. Press the SINGLE PULSE button.

67. Verify that the RG display is 0011 111 111 111 101.

68. Press the SINGLE PULSE button twice.

69. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

70. Set the T12 COUNTER STOP switch to the ON position.

71. Set the INCREMENTS INHIBIT switch to the ON position.

72. Set the Agreement A switch to the OFF position.

73. Set the Y MARGINS switch to the NORM position.

CDU Y INPUT TEST

74. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

75. Press Keys CL, 00033, 37776.

76. Verify that the RZ display is 0000 000 000 011 011.

77. Verify that the REG SEL display is 0011 111 111 111 110.

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JOB CDU COUNTERS TEST JDC 05788 REV B PAGE 4 OF 28

SUBSYSTEM Computer ASSY Block II C-Computer

78. Press the EXECUTE button.

79. Verify that the LINC indicator is on.

80. Verify that the RG display is 0011 111 111 111 110.

81. Set the AGREEMENT A switches to XXXX 0033.

82. Press the MONITOR indicator switch to the on (illuminated) position.

83. Set the T12 COUNTER STOP switch to the OFF position.

84. Set the INCREMENTS INHIBIT switch to the OFF position.

85. Set the AGC INPUT COUNTERS switch to position 4.

86. Press the POSITIVE indicator switch to the on (illuminated) position.

87. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

88. Set the Agreement A switch to SAMPLE.

89. Press the PROCEED button.

90. Press the SINGLE PULSE button.

91. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

92. Press the SINGLE PULSE button.

93. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

94. Press the SINGLE PULSE button.

95. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

96. Press the POSITIVE indicator switch to the off (extinguished) position.

97. Press the NEGATIVE indicator switch to the on (illuminated) position.

98. Press the SINGLE PULSE button.

99. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

100. Press the SINGLE PULSE button twice.

101. Verify that the RG display is 0011 111 111 111 110.

102. Set the T12 COUNTER STOP switch to the ON position.

103. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

104. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

105. Press Keys CL, 00033, 37776.

106. Verify that the RZ display is 0000 000 000 011 011.

107. Verify that the REG SEL display is 0011 111 111 111 110.

108. Press the EXECUTE button.

109. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

110. Set the Y MARGINS switch to the V2 (High Zero) position.

111. Press the MONITOR indicator switch to the on (illuminated) position.

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112. Press the NEGATIVE indicator switch to the off (extinguished) position.

113. Press the POSITIVE indicator switch to the on (illuminated) position.

114. Set the T12 COUNTER STOP switch to the OFF position.

115. Set the INCREMENTS INHIBIT switch to the OFF position.

116. Press the PROCEED button.

117. Press the SINGLE PULSE button.

118. Verify that the RG display is 0011 111 111 111 110.

119. Press the SINGLE PULSE button.

120. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

121. Press the POSITIVE indicator switch to the off (extinguished) position.

122. Press the NEGATIVE indicator switch to the on (illuminated) position.

123. Press the SINGLE PULSE button.

124. Verify that the RG display is 0011 111 111 111 110.

125. Press the SINGLE PULSE button twice.

126. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

127. Set the T12 COUNTER STOP switch to the ON position.

128. Set the Y MARGINS switch to the V3 (Low One) position.

129. Set the T12 COUNTER STOP switch to the OFF position.

130. Press the PROCEED button.

131. Press the SINGLE PULSE button.

132. Verify that the RG display is 0011 111 111 111 101.

133. Press the SINGLE PULSE button.

134. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

135. Press the NEGATIVE indicator switch to the off (extinguished) position.

136. Press the POSITIVE indicator switch to the on (illuminated) position.

137. Press the SINGLE PULSE button.

138. Verify that the RG display is 0011 111 111 111 101.

139. Press the SINGLE PULSE button twice.

140. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

141. Set the T12 COUNTER STOP switch to the ON position.

142. Set the INCREMENTS INHIBIT switch to the ON position.

143. Set the Agreement A switch to the OFF position.

144. Set the Y MARGINS switch to the NORM position.

CDU Z INPUT TEST

145. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

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146. Press Keys CL, 00034, 37776.

147. Verify that the RZ display is 0000 000 000 011 100.

148. Verify that the REG SEL display is 0011 111 111 111 110.

149. Press the EXECUTE button.

150. Verify that the LINC indicator is on.

151. Verify that the RG display is 0011 111 111 111 110.

152. Set the AGREEMENT A switches to XXXX 0034.

153. Press the MONITOR indicator switch to the on (illuminated) position.

154. Set the T12 COUNTER STOP switch to the OFF position.

155. Set the INCREMENTS INHIBIT switch to the OFF position.

156. Set the AGC INPUT COUNTERS switch to position 5.

157. Press the POSITIVE indicator switch to the on (illuminated) position.

158. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

159. Set the Agreement A switch to SAMPLE.

160. Press the PROCEED button.

161. Press the SINGLE PULSE button.

162. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

163. Press the SINGLE PULSE button.

164. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

165. Press the SINGLE PULSE button.

166. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

167. Press the POSITIVE indicator switch to the off (extinguished) position.

168. Press the NEGATIVE indicator switch to the on (illuminated) position.

169. Press the SINGLE PULSE button.

170. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

171. Press the SINGLE PULSE button twice.

172. Verify that the RG display is 0011 111 111 111 110.

173. Set the T12 COUNTER STOP switch to the ON position.

174. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

175. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

176. Press Keys CL, 00034, 37776.

177. Verify that the RZ display is 0000 000 000 011 100.

178. Verify that the REG SEL display is 0011 111 111 111 110.

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179. Press the EXECUTE button.

180. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

181. Set the Y MARGINS switch to the V2 (High Zero) position.

182. Press the MONITOR indicator switch to the on (illuminated) position.

183. Press the NEGATIVE indicator switch to the off (extinguished) position.

184. Press the POSITIVE indicator switch to the on (illuminated) position.

185. Set the T12 COUNTER STOP switch to the OFF position.

186. Set the INCREMENTS INHIBIT switch to the OFF position.

187. Press the PROCEED button.

188. Press the SINGLE PULSE button.

189. Verify that the RG display is 0011 111 111 111 110.

190. Press the SINGLE PULSE button.

191. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

192. Press the POSITIVE indicator switch to the off (extinguished) position.

193. Press the NEGATIVE indicator switch to the on (illuminated) position.

194. Press the SINGLE PULSE button.

195. Verify that the RG display is 0011 111 111 111 110.

196. Press the SINGLE PULSE button twice.

197. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

198. Set the T12 COUNTER STOP switch to the ON position.

199. Set the Y MARGINS switch to the V3 (Low One) position.

200. Set the T12 COUNTER STOP switch to the OFF position.

201. Press the PROCEED button.

202. Press the SINGLE PULSE button.

203. Verify that the RG display is 0011 111 111 111 101.

204. Press the SINGLE PULSE button.

205. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

206. Press the NEGATIVE indicator switch to the off (extinguished) position.

207. Press the POSITIVE indicator switch to the on (illuminated) position.

208. Press the SINGLE PULSE button.

209. Verify that the RG display is 0011 111 111 111 101.

210. Press the SINGLE PULSE button twice.

211. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

212. Set the T12 COUNTER STOP switch to the ON position.

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213. Set the INCREMENTS INHIBIT switch to the ON position.

214. Set the Agreement A switch to the OFF position.

215. Set the Y MARGINS switch to the NORM position.

CDU T INPUT TEST

216. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

217. Press Keys CL, 00035, 37776.

218. Verify that the RZ display is 0000 000 000 011 101.

219. Verify that the REG SEL display is 0011 111 111 111 110.

220. Press the EXECUTE button.

221. Verify that the LINC indicator is on.

222. Verify that the RG display is 0011 111 111 111 110.

223. Set the AGREEMENT A switches to XXXX 0035.

224. Press the MONITOR indicator switch to the on (illuminated) position.

225. Set the T12 COUNTER STOP switch to the OFF position.

226. Set the INCREMENTS INHIBIT switch to the OFF position.

227. Set the AGC INPUT COUNTERS switch to position 2.

228. Press the POSITIVE indicator switch to the on (illuminated) position.

229. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

230. Set the Agreement A switch to SAMPLE.

231. Press the PROCEED button.

232. Press the SINGLE PULSE button.

233. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

234. Press the SINGLE PULSE button.

235. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

236. Press the SINGLE PULSE button.

237. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

238. Press the POSITIVE indicator switch to the off (extinguished) position.

239. Press the NEGATIVE indicator switch to the on (illuminated) position.

240. Press the SINGLE PULSE button.

241. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

242. Press the SINGLE PULSE button twice.

243. Verify that the RG display is 0011 111 111 111 110.

244. Set the T12 COUNTER STOP switch to the ON position.

245. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

246. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

247. Press Keys CL, 00035, 37776.

248. Verify that the RZ display is 0000 000 000 011 101.

249. Verify that the REG SEL display is 0011 111 111 111 110.

250. Press the EXECUTE button.

251. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

252. Set the Y MARGINS switch to the V2 (High Zero) position.

253. Press the MONITOR indicator switch to the on (illuminated) position.

254. Press the NEGATIVE indicator switch to the off (extinguished) position.

255. Press the POSITIVE indicator switch to the on (illuminated) position.

256. Set the T12 COUNTER STOP switch to the OFF position.

257. Set the INCREMENTS INHIBIT switch to the OFF position.

258. Press the PROCEED button.

259. Press the SINGLE PULSE button.

260. Verify that the RG display is 0011 111 111 111 110.

261. Press the SINGLE PULSE button.

262. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

263. Press the POSITIVE indicator switch to the off (extinguished) position.

264. Press the NEGATIVE indicator switch to the on (illuminated) position.

265. Press the SINGLE PULSE button.

266. Verify that the RG display is 0011 111 111 111 110.

267. Press the SINGLE PULSE button twice.

268. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

269. Set the T12 COUNTER STOP switch to the ON position.

270. Set the Y MARGINS switch to the V3 (Low One) position.

271. Set the T12 COUNTER STOP switch to the OFF position.

272. Press the PROCEED button.

273. Press the SINGLE PULSE button.

274. Verify that the RG display is 0011 111 111 111 101.

275. Press the SINGLE PULSE button.

276. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

277. Press the NEGATIVE indicator switch to the off (extinguished) position.

278. Press the POSITIVE indicator switch to the on (illuminated) position.

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279. Press the SINGLE PULSE button.

280. Verify that the RG display is 0011 111 111 111 101.

281. Press the SINGLE PULSE button twice.

282. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

283. Set the T12 COUNTER STOP switch to the ON position.

284. Set the INCREMENTS INHIBIT switch to the ON position.

285. Set the Agreement A switch to the OFF position.

286. Set the Y MARGINS switch to the NORM position.

CDU S INPUT TEST

287. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

288. Press Keys CL, 0036, 37776.

289. Verify that the RZ display is 0000 000 000 011 110.

290. Verify that the REG SEL display is 0011 111 111 111 110.

291. Press the EXECUTE button.

292. Verify that the LINC indicator is on.

293. Verify that the RG display is 0011 111 111 111 110.

294. Set the AGREEMENT A switches to XXXX 0036.

295. Press the MONITOR indicator switch to the on (illuminated) position.

296. Set the T12 COUNTER STOP switch to the OFF position.

297. Set the INCREMENTS INHIBIT switch to the OFF position.

298. Set the AGC INPUT COUNTERS switch to position 1.

299. Press the POSITIVE indicator switch to the on (illuminated) position.

300. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

301. Set the Agreement A switch to SAMPLE.

302. Press the PROCEED button.

303. Press the SINGLE PULSE button.

304. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

305. Press the SINGLE PULSE button.

306. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

307. Press the SINGLE PULSE button.

308. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

309. Press the POSITIVE indicator switch to the off (extinguished) position.

310. Press the NEGATIVE indicator switch to the on (illuminated) position.

311. Press the SINGLE PULSE button.

312. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

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313. Press the SINGLE PULSE button twice.

314. Verify that the RG display is 0011 111 111 111 110.

315. Set the T12 COUNTER STOP switch to the ON position.

316. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

317. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

318. Press Keys CL, 00036, 37776.

319. Verify that the RZ display is 0000 000 000 011 110.

320. Verify that the REG SEL display is 0011 111 111 111 110.

321. Press the EXECUTE button.

322. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

323. Set the Y MARGINS switch to the V2 (High Zero) position.

324. Press the MONITOR indicator switch to the on (illuminated) position.

325. Press the NEGATIVE indicator switch to the off (extinguished) position.

326. Press the POSITIVE indicator switch to the on (illuminated) position.

327. Set the T12 COUNTER STOP switch to the OFF position.

328. Set the INCREMENTS INHIBIT switch to the OFF position.

329. Press the PROCEED button.

330. Press the SINGLE PULSE button.

331. Verify that the RG display is 0011 111 111 111 110.

332. Press the SINGLE PULSE button.

333. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

334. Press the POSITIVE indicator switch to the off (extinguished) position.

335. Press the NEGATIVE indicator switch to the on (illuminated) position.

336. Press the SINGLE PULSE button.

337. Verify that the RG display is 0011 111 111 111 110.

338. Press the SINGLE PULSE button twice.

339. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

340. Set the T12 COUNTER STOP switch to the ON position.

341. Set the Y MARGINS switch to the V3 (Low One) position.

342. Set the T12 COUNTER STOP switch to the OFF position.

343. Press the PROCEED button.

344. Press the SINGLE PULSE button.

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345. Verify that the RG display is 0011 111 111 111 101.

346. Press the SINGLE PULSE button.

347. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

348. Press the NEGATIVE indicator switch to the off (extinguished) position.

349. Press the POSITIVE indicator switch to the on (illuminated) position.

350. Press the SINGLE PULSE button.

351. Verify that the RG display is 0011 111 111 111 101.

352. Press the SINGLE PULSE button twice.

353. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

354. Set the T12 COUNTER STOP switch to the ON position.

355. Set the INCREMENTS INHIBIT switch to the ON position.

356. Set the Agreement A switch to the OFF position.

357. Set the Y MARGINS switch to the NORM position.

CDU X OUTPUT TEST

358. Verify that the STRT1/STRT2 switch on the Buffer Circuit Assembly is in the OFF position.

359. Press the LOAD CHAN & 510 OHMS indicator switch to the on (illuminated) position.

360. Set the FREQ + PHASE switch to the FRS S → T position.

361. Prepare the CTS FREQUENCY COUNTER for operation as specified in step 1 of JDC 05402.

> NOTE: During this test, the FREQUENCY COUNTER is to be operated as described under PROCEDURE on JDC 05402.

362. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

363. Press Keys CL, 00050, 77777.

364. Verify that the RZ display is 0000 000 000 101 000.

365. Verify that the REG SEL display is 0111 111 111 111 111.

366. Press the EXECUTE button.

367. Verify that the LINC indicator is on.

368. Press the READ AGC indicator switch to the on (illuminated) position.

369. Press Keys CL, 0050.

370. Verify that the RZ display is 0000 000 000 101 000.

371. Press the EXECUTE button.

372. Verify that the OINC indicator is on.

373. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

374. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

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375. Press Keys CL, 00050, 52525.

376. Verify that the RZ display is 0000 000 000 101 000.

377. Verify that the REG SEL display is 0101 010 101 010 101.

378. Press the EXECUTE button.

379. Verify that the LINC indicator is on.

380. Press the READ AGC indicator switch to the on (illuminated) position.

381. Press Keys CL, 0050.

382. Verify that the RZ display is 0000 000 000 101 000.

383. Press the EXECUTE button.

384. Verify that the OINC indicator is on.

385. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

386. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

387. Press Keys CL, 00050, 00000.

388. Verify that the RZ display is 0000 000 000 101 000.

389. Verify that the REG SEL display is 0000 000 000 000 000.

390. Press the EXECUTE button.

391. Verify that the LINC indicator is on.

392. Press the READ AGC indicator switch to the on (illuminated) position.

393. Press Keys CL, 0050.

394. Verify that the RZ display is 0000 000 000 101 000.

395. Press the EXECUTE button.

396. Verify that the OINC indicator is on.

397. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

398. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

399. Press Keys CL, 00014, 40000.

400. Verify that the RZ display is 0000 000 000 001 100.

401. Verify that the REG SEL display is 0100 000 000 000 000.

402. Press the CHANNEL button.

403. Press the EXECUTE button.

404. Verify that the LINC indicator is on.

405. Press Keys CL, 00050, 02000.

406. Verify that the RZ display is 0000 000 000 101 000.

407. Verify that the REG SEL display is 0000 010 000 000 000.

408. Press the EXECUTE button.

409. Set the CHANNEL 8 switches to the 201 position.

410. Set the INHIBIT INTERRUPT switch to the OFF position.

411. Press the MONITOR indicator switch to the on (illuminated) position, and set the AGC INPUT COUNTER switch to position 3.

position 3.

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412. Set the INCREMENTS INHIBIT switch to the OFF position.

413. Set the T12 COUNTER STOP switch to the OFF position.

414. Press the RESET button on the FREQUENCY COUNTER.

415. Press the PROCEED button.

416. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

417. Set the T12 COUNTER STOP switch to the ON position.

418. Set the INCREMENTS INHIBIT switch to the ON position.

419. Set the INHIBIT INTERRUPT switch to the ON position.

420. Press the READ AGC indicator switch to the on (illuminated) position.

421. Press Keys CL, 0014.

422. Verify that the RZ display is 0000 000 000 001 100.

423. Press the CHANNEL button.

424. Press the EXECUTE button.

425. Verify that the OINC indicator is on.

426. Verify that BIT 16 of the REG SEL display is a "0". Stamp data sheet.

427. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

428. Press Keys CL, 00014, 40000.

429. Verify that the RZ display is 0000 000 000 001 100.

430. Verify that the REG SEL display is 0100 000 000 000 000.

431. Press the CHANNEL button.

432. Press the EXECUTE button.

433. Verify that the LINC indicator is on.

434. Press Keys CL, 00050, 75777.

435. Verify that the RZ display is 0000 000 000 101 000.

436. Verify that the REG SEL display is 0111 101 111 111 111.

437. Press the EXECUTE button.

438. Set the CHANNEL 8 switches to the 202 position.

439. Press the MONITOR indicator switch to the on (illuminated) position.

440. Set the INCREMENTS INHIBIT switch to the OFF position.

441. Set the INHIBIT INTERRUPT switch to the OFF position.

442. Set the T12 COUNTER STOP switch to the OFF position.

443. Press the RESET button on the FREQUENCY COUNTER.

444. Press the PROCEED button.

445. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

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446. Set the T12 COUNTER STOP switch to the ON position.

447. Set the INCREMENTS INHIBIT switch to the ON position.

448. Set the INHIBIT INTERRUPT switch to the ON position.

449. Press the READ AGC indicator switch to the on (illuminated) position.

450. Press Keys CL, 0014.

451. Verify that the RZ display is 0000 000 000 001 100.

452. Press the CHANNEL button.

453. Press the EXECUTE button.

454. Verify that the OINC indicator is on.

455. Verify that BIT 16 of the REG SEL display is a "0". Stamp data sheet.

CDU Y OUTPUT TEST

456. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

457. Press Keys CL, 00051, 77777.

458. Verify that the RZ display is 0000 000 000 101 001.

459. Verify that the REG SEL display is 0111 111 111 111 111.

460. Press the EXECUTE button.

461. Verify that the LINC indicator is on.

462. Press the READ AGC indicator switch to the on (illuminated) position.

463. Press Keys CL, 0051.

464. Verify that the RZ display is 0000 000 000 101 001.

465. Press the EXECUTE button.

466. Verify that the OINC indicator is on.

467. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

468. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

469. Press Keys CL, 00051, 52525.

470. Verify that the RZ display is 0000 000 000 101 001.

471. Verify that the REG SEL display is 0101 010 101 010 101.

472. Press the EXECUTE button.

473. Verify that the LINC indicator is on.

474. Press the READ AGC indicator switch to the on (illuminated) position.

475. Press Keys CL, 0051.

476. Verify that the RZ display is 0000 000 000 101 001.

477. Press the EXECUTE button.

478. Verify that the OINC indicator is on.

479. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

480. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

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481. Press Keys CL, 00051, 00000.

482. Verify that the RZ display is 0000 000 000 101 001.

483. Verify that the REG SEL display is 0000 000 000 000 000.

484. Press the EXECUTE button.

485. Verify that the LINC indicator is on.

486. Press the READ AGC indicator switch to the on (illuminated) position.

487. Press Keys CL, 0051.

488. Verify that the RZ display is 0000 000 000 101 001.

489. Press the EXECUTE button.

490. Verify that the OINC indicator is on.

491. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

492. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

493. Press Keys CL, 00014, 20000.

494. Verify that the RZ display is 0000 000 000 001 100.

495. Verify that the REG SEL display is 0010 000 000 000 000.

496. Press the CHANNEL button.

497. Press the EXECUTE button.

498. Verify that the LINC indicator is on.

499. Press Keys CL, 00051, 02000.

500. Verify that the RZ display is 0000 000 000 101 001.

501. Verify that the REG SEL display is 0000 010 000 000 000.

502. Press the EXECUTE button.

503. Set the CHANNEL 8 switches to the 203 position.

504. Set the INHIBIT INTERRUPT switch to the OFF position.

505. Press the MONITOR indicator switch to the on (illuminated) position.

506. Set the INCREMENTS INHIBIT switch to the OFF position.

507. Set the T12 COUNTER STOP switch to the OFF position and set the AGC INPUT COUNTER switch to position 4.

508. Press the RESET button on the FREQUENCY COUNTER.

509. Press the PROCEED button.

510. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

511. Set the T12 COUNTER STOP switch to the ON position.

512. Set the INCREMENTS INHIBIT switch to the ON position.

513. Set the INHIBIT INTERRUPT switch to the ON position.

514. Press the READ AGC indicator switch to the on (illuminated) position.

515. Press Keys CL, 0014.

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516. Verify that the RZ display is 0000 000 000 001 100.

517. Press the CHANNEL button.

518. Press the EXECUTE button.

519. Verify that the OINC indicator is on.

520. Verify that BIT 14 of the REG SEL display is a "0". Stamp data sheet.

521. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

522. Press Keys CL, 00014, 20000.

523. Verify that the RZ display is 0000 000 000 001 100.

524. Verify that the REG SEL display is 0010 000 000 000 000.

525. Press the CHANNEL button.

526. Press the EXECUTE button.

527. Verify that the LINC indicator is on.

528. Press Keys CL, 00051, 75777.

529. Verify that the RZ display is 0000 000 000 101 001.

530. Verify that the REG SEL display is 0111 101 111 111 111.

531. Press the EXECUTE button.

532. Set the CHANNEL S switches to the 204 position.

533. Press the MONITOR indicator switch to the on (illuminated) position.

534. Set the INCREMENTS INHIBIT switch to the OFF position.

535. Set the INHIBIT INTERRUPT switch to the OFF position.

536. Set the T12 COUNTER STOP switch to the OFF position.

537. Press the RESET button on the FREQUENCY COUNTER.

538. Press the PROCEED button.

539. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

540. Set the T12 COUNTER STOP switch to the ON position.

541. Set the INCREMENTS INHIBIT switch to the ON position.

542. Set the INHIBIT INTERRUPT switch to the ON position.

543. Press the READ AGC indicator switch to the on (illuminated) position.

544. Press Keys CL, 0014.

545. Verify that the RZ display is 0000 000 000 001 100.

546. Press the CHANNEL button.

547. Press the EXECUTE button.

548. Verify that the OINC indicator is on.

549. Verify that BIT 14 of the REG SEL display is a "0". Stamp data sheet.

CDU Z OUTPUT TEST

550. Set the AGC INPUT COUNTERS switch to position 5, and press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

551. Press Keys CL, 00052, 77777.

S. T th. AGC INPUT [illegible] switch to posn. 5 [illegible]

552. Verify that the RZ display is 0000 000 000 101 010.

553. Verify that the REG SEL display is 0111 111 111 111 111.

554. Press the EXECUTE button.

555. Verify that the LINC indicator is on.

556. Press the READ AGC indicator switch to the on (illuminated) position.

557. Press Keys CL, 0052.

558. Verify that the RZ display is 0000 000 000 101 010.

559. Press the EXECUTE button.

560. Verify that the OINC indicator is on.

561. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

562. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

563. Press Keys CL, 00052, 52525.

564. Verify that the RZ display is 0000 000 000 101 010.

565. Verify that the REG SEL display is 0101 010 101 010 101.

566. Press the EXECUTE button.

567. Verify that the LINC indicator is on.

568. Press the READ AGC indicator switch to the on (illuminated) position.

569. Press Keys CL, 0052.

570. Verify that the RZ display is 0000 000 000 101 010.

571. Press the EXECUTE button.

572. Verify that the OINC indicator is on.

573. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

574. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

575. Press Keys CL, 00052, 00000.

576. Verify that the RZ display is 0000 000 000 101 010.

577. Verify that the REG SEL display is 0000 000 000 000 000.

578. Press the EXECUTE button.

579. Verify that the LINC indicator is on.

580. Press the READ AGC indicator switch to the on (illuminated) position.

581. Press Keys CL, 0052.

582. Verify that the RZ display is 0000 000 000 101 010.

583. Press the EXECUTE button.

584. Verify that the OINC indicator is on.

585. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

586. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

587. Press Keys CL, 00014, 10000.

588. Verify that the RZ display is 0000 000 000 001 100.

589. Verify that the REG SEL display is 0001 000 000 000 000.

590. Press the CHANNEL button.

591. Press the EXECUTE button.

592. Verify that the LINC indicator is on.

593. Press Keys CL, 00052, 02000.

594. Verify that the RZ display is 0000 000 000 101 010.

595. Verify that the REG SEL display is 0000 010 000 000 000.

596. Press the EXECUTE button.

597. Set the CHANNEL S switches to the 205 position.

598. Set the INHIBIT INTERRUPT switch to the OFF position.

599. Press the MONITOR indicator switch to the on (illuminated) position.

600. Set the INCREMENTS INHIBIT switch to the OFF position.

601. Set the T12 COUNTER STOP switch to the OFF position.

602. Press the RESET button on the FREQUENCY COUNTER.

603. Press the PROCEED button.

604. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

605. Set the T12 COUNTER STOP switch to the ON position.

606. Set the INCREMENTS INHIBIT switch to the ON position.

607. Set the INHIBIT INTERRUPT switch to the ON position.

608. Press the READ AGC indicator switch to the on (illuminated) position.

609. Press Keys CL, 0014.

610. Verify that the RZ display is 0000 000 000 001 100.

611. Press the CHANNEL button.

612. Press the EXECUTE button.

613. Verify that the OINC indicator is on.

614. Verify that BIT 13 of the REG SEL display is a "0". Stamp data sheet.

615. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

616. Press Keys CL, 00014, 10000.

617. Verify that the RZ display is 0000 000 000 001 100.

618. Verify that the REG SEL display is 0001 000 000 000 000.

619. Press the CHANNEL button.

620. Press the EXECUTE button.

621. Verify that the LINC indicator is on.

622. Press Keys CL, 00052, 75777.

623. Verify that the RZ display is 0000 000 000 101 010.

624. Verify that the REG SEL display is 0111 101 111 111 111.

625. Press the EXECUTE button.

626. Set the CHANNEL S switches to the 206 position.

627. Press the MONITOR indicator switch to the on (illuminated) position.

628. Set the INCREMENTS INHIBIT switch to the OFF position.

629. Set the INHIBIT INTERRUPT switch to the OFF position.

630. Set the T12 COUNTER STOP switch to the OFF position.

631. Press the RESET button on the FREQUENCY COUNTER.

632. Press the PROCEED button.

633. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

634. Set the T12 COUNTER STOP switch to the ON position.

635. Set the INCREMENTS INHIBIT switch to the ON position.

636. Set the INHIBIT INTERRUPT switch to the ON position.

637. Press the READ AGC indicator switch to the on (illuminated) position.

638. Press Keys CL, 0014.

639. Verify that the RZ display is 0000 000 000 001 100.

640. Press the CHANNEL button.

641. Press the EXECUTE button.

642. Verify that the OINC indicator is on.

643. Verify that BIT 13 of the REG SEL display is a "0". Stamp data sheet.

CDU T OUTPUT TEST

644. Set the CHANNEL S switches to position 101.

645. Press the LOAD CHAN T 510 OHMS switch to the on (illuminated) position.

646. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

647. Press Keys CL, 00053, 77777.

648. Verify that the RZ display is 0000 000 000 101 011.

649. Verify that the REG SEL display is 0111 111 111 111 111.

650. Press the EXECUTE button.

651. Verify that the LINC indicator is on.

652. Press the READ AGC indicator switch to the on (illuminated) position.

653. Press Keys CL, 0053.

654. Verify that the RZ display is 0000 000 000 101 011.

655. Press the EXECUTE button.

656. Verify that the OINC indicator is on.

657. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

658. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

659. Press Keys CL, 00053, 52525.

660. Verify that the RZ display is 0000 000 000 101 011.

661. Verify that the REG SEL display is 0101 010 101 010 101.

662. Press the EXECUTE button.

663. Verify that the LINC indicator is on.

664. Press the READ AGC indicator switch to the on (illuminated) position.

665. Press Keys CL, 0053.

666. Verify that the RZ display is 0000 000 000 101 011.

667. Press the EXECUTE button.

668. Verify that the OINC indicator is on.

669. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

670. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

671. Press Keys CL, 00053, 00000.

672. Verify that the RZ display is 0000 000 000 101 011.

673. Verify that the REG SEL display is 0000 000 000 000 000.

674. Press the EXECUTE button.

675. Verify that the LINC indicator is on.

676. Press the READ AGC indicator switch to the on (illuminated) position.

677. Press Keys CL, 0053.

678. Verify that the RZ display is 0000 000 000 101 011.

679. Press the EXECUTE button.

680. Verify that the OINC indicator is on.

681. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

682. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

683. Press Keys CL, 00014, 04000.

684. Verify that the RZ display is 0000 000 000 001 100.

685. Verify that the REG SEL display is 0000 100 000 000 000.

686. Press the CHANNEL button.

687. Press the EXECUTE button.

688. Verify that the LINC indicator is on.

689. Press Keys CL, 00053, 02000.

690. Verify that the RZ display is 0000 000 000 101 011.

691. Verify that the REG SEL display is 0000 010 000 000 000.

692. Press the EXECUTE button.

693. Set the CHANNEL T switches to the 203 position.

694. Set the FREQ+ PHASE switch to the FRT T → S position.

695. Set the INHIBIT INTERRUPT switch to the OFF position.

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696. Press the MONITOR indicator switch to the on (illuminated) position.

697. Set the AGC INPUT COUNTERS switch to position 2.

698. Set the INCREMENTS INHIBIT switch to the OFF position.

699. Set the T12 COUNTER STOP switch to the OFF position.

700. Press the RESET button on the FREQUENCY COUNTER.

701. Press the PROCEED button.

702. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

703. Set the T12 COUNTER STOP switch to the ON position.

704. Set the INCREMENTS INHIBIT switch to the ON position.

705. Set the INHIBIT INTERRUPT switch to the ON position.

706. Press the READ AGC indicator switch to the on (illuminated) position.

707. Press Keys CL, 0014.

708. Verify that the RZ display is 0000 000 000 001 100.

709. Press the CHANNEL button.

710. Press the EXECUTE button.

711. Verify that the OINC indicator is on.

712. Verify that BIT 12 of the REG SEL display is a "0". Stamp data sheet.

713. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

714. Press Keys CL, 00014, 04000.

715. Verify that the RZ display is 0000 000 000 001 100.

716. Verify that the REG SEL display is 0000 100 000 000 000.

717. Press the CHANNEL button.

718. Press the EXECUTE button.

719. Verify that the LINC indicator is on.

720. Press Keys CL, 00053, 75777.

721. Verify that the RZ display is 0000 000 000 101 011.

722. Verify that the REG SEL display is 0111 101 111 111 111.

723. Press the EXECUTE button.

724. Set the CHANNEL T switches to the 204 position.

725. Press the POSITIVE indicator switch to the off position, and press the NEGATIVE indicator switch to the on (illuminated) position.

726. Press the MONITOR indicator switch to the on (illuminated) position.

727. Set the INCREMENTS INHIBIT switch to the OFF position.

728. Set the INHIBIT INTERRUPT switch to the OFF position.

729. Set the T12 COUNTER STOP switch to the OFF position.

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730. Press the RESET button on the FREQUENCY COUNTER.

731. Press the PROCEED button.

732. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

733. Set the T12 COUNTER STOP switch to the ON position.

734. Set the INCREMENTS INHIBIT switch to the ON position.

735. Set the INHIBIT INTERRUPT switch to the ON position.

736. Press the READ AGC indicator switch to the on (illuminated) position.

737. Press Keys CL, 0014.

738. Verify that the RZ display is 0000 000 000 001 100.

739. Press the CHANNEL button.

740. Press the EXECUTE button.

741. Verify that the OINC indicator is on.

742. Verify that BIT 12 of the REG SEL display is a "0". Stamp data sheet.

CDU S OUTPUT TEST

743. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

744. Press Keys CL, 00054, 77777.

745. Verify that the RZ display is 0000 000 000 101 100.

746. Verify that the REG SEL display is 0111 111 111 111 111.

747. Press the EXECUTE button.

748. Verify that the LINC indicator is on.

749. Press the READ AGC indicator switch to the on (illuminated) position.

750. Press Keys CL, 0054.

751. Verify that the RZ display is 0000 000 000 101 100.

752. Press the EXECUTE button.

753. Verify that the OINC indicator is on.

754. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

755. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

756. Press Keys CL, 00054, 52525.

757. Verify that the RZ display is 0000 000 000 101 100.

758. Verify that the REG SEL display is 0101 010 101 010 101.

759. Press the EXECUTE button.

760. Verify that the LINC indicator is on.

761. Press the READ AGC indicator switch to the on (illuminated) position.

762. Press Keys CL, 0054.

763. Verify that the RZ display is 0000 000 000 101 100.

764. Press the EXECUTE button.

765. Verify that the OINC indicator is on.

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766. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

767. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

768. Press Keys CL, 00054, 00000.

769. Verify that the RZ display is 0000 000 000 101 100.

770. Verify that the REG SEL display is 0000 000 000 000 000.

771. Press the EXECUTE button.

772. Verify that the LINC indicator is on.

773. Press the READ AGC indicator switch to the on (illuminated) position.

774. Press Keys CL, 0054.

775. Verify that the RZ display is 0000 000 000 101 100.

776. Press the EXECUTE button.

777. Verify that the OINC indicator is on.

778. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

779. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

780. Set the AGC INPUT COUNTER switch to position 1.

781. Press Keys CL, 00014, 02000.

782. Verify that the RZ display is 0000 000 000 001 100.

783. Verify that the REG SEL display is 0000 010 000 000 000.

784. Press the CHANNEL button.

785. Press the EXECUTE button.

786. Verify that the LINC indicator is on.

787. Press Keys CL, 00054, 02000.

788. Verify that the RZ display is 0000 000 000 101 100.

789. Verify that the REG SEL display is 0000 010 000 000 000.

790. Press the EXECUTE button.

791. Set the CHANNEL T switches to the 201 position.

792. Set the INHIBIT INTERRUPT switch to the OFF position.

793. Press the MONITOR indicator switch to the on (illuminated) position.

794. Set the INCREMENTS INHIBIT switch to the OFF position.

795. Set the T12 COUNTER STOP switch to the OFF position.

796. Press the NEGATIVE indicator switch to the off position, and press the POSITIVE indicator switch to the on position.

797. Press the RESET button on the FREQUENCY COUNTER.

798. Press the PROCEED button.

799. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

800. Set the T12 COUNTER STOP switch to the ON position.

801. Set the INCREMENTS INHIBIT switch to the ON position.

802. Set the INHIBIT INTERRUPT switch to the ON position.

803. Press the READ AGC indicator switch to the on (illuminated) position.

804. Press Keys CL, 0014.

805. Verify that the RZ display is 0000 000 000 001 100.

806. Press the CHANNEL button.

807. Press the EXECUTE button.

808. Verify that the OINC indicator is on.

809. Verify that BIT 11 of the REG SEL display is a "0". Stamp data sheet.

810. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

811. Press Keys CL, 00014, 02000.

812. Verify that the RZ display is 0000 000 000 001 100.

813. Verify that the REG SEL display is 0000 010 000 000 000.

814. Press the CHANNEL button.

815. Press the EXECUTE button.

816. Verify that the LINC indicator is on.

817. Press Keys CL, 00054, 75777.

818. Verify that the RZ display is 0000 000 000 101 100.

819. Verify that the REG SEL display is 0111 101 111 111 111.

820. Press the EXECUTE button.

821. Set the CHANNEL T switches to the 202 position.

822. Press the MONITOR indicator switch to the on (illuminated) position.

823. Set the AGC INPUT COUNTERS to position 1.

824. Press the NEGATIVE indicator switch to the on position (illuminated), and press the POSITIVE indicator switch to the off position (not illuminated).

825. Set the INCREMENTS INHIBIT switch to the OFF position.

826. Set the INHIBIT INTERRUPT switch to the OFF position.

827. Set the T12 COUNTER STOP switch to the OFF position.

828. Press the RESET button on the FREQUENCY COUNTER.

829. Press the PROCEED button.

830. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

831. Set the T12 COUNTER STOP switch to the ON position.

832. Set the INCREMENTS INHIBIT switch to the ON position.

833. Set the INHIBIT INTERRUPT switch to the ON position.

834. Press the READ AGC indicator switch to the on (illuminated) position.

835. Press Keys CL, 0014.

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836. Verify that the RZ display is 0000 000 000 001 100.

837. Press the CHANNEL button.

838. Press the EXECUTE button.

839. Verify that the OINC indicator is on.

840. Verify that BIT 11 of the REG SEL display is a "0". Stamp data sheet.

841. Set the CHANNEL T switches to position 101.

842. Set the FREQ + PHASE switch to the FRS 8 → T position.

CDU-X

843. Set the AGC INPUT COUNTERS switch to position 3.

844. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

845. Press Keys CL, 00014, 40000.

846. Verify that the RZ display is 0000 000 000 001 100.

847. Verify that the REG SEL display is 0100 000 000 000 000.

848. Press the CHANNEL button.

849. Press the EXECUTE button.

850. Verify that the LINC indicator is on.

851. Press Keys CL, 00050, 75777.

852. Verify that the RZ display is 0000 000 000 101 000.

853. Verify that the REG SEL display is 0111 101 111 111 111.

854. Press the EXECUTE button.

855. Set the CHANNEL S switches to the 202 position.

856. Press the MONITOR indicator switch to the on (illuminated) position.

857. Set the INCREMENTS INHIBIT switch to the OFF position.

858. Set the INHIBIT INTERRUPT switch to the OFF position.

859. Set the T12 COUNTER STOP switch to the OFF position.

860. Press the RESET button on the FREQUENCY COUNTER.

861. Press the PROCEED button.

862. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

863. Set the T12 COUNTER STOP switch to the ON position.

864. Set the INCREMENTS INHIBIT switch to the ON position.

865. Set the INHIBIT INTERRUPT switch to the ON position.

866. Press the READ AGC indicator switch to the on (illuminated) position.

867. Press Keys CL, 0014.

868. Verify that the RZ display is 0000 000 000 001 100.

869. Press the CHANNEL button.

870. Press the EXECUTE button.

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871. Verify that the OINC incidator is on.

872. Verify that BIT 15 of the REG SEL display is a "0". Stamp data sheet.

CDU-Y

873. Set the AGC INPUT COUNTERS switch to position 4.

874. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

875. Press Keys CL, 00014, 20000.

876. Verify that the RZ display is 0000 000 000 001 100.

877. Verify that the REG SEL display is 0010 000 000 000 000.

878. Press the CHANNEL button.

879. Press the EXECUTE button.

880. Verify that the LINC indicator is on.

881. Press Keys CL, 00051, 75777.

882. Verify that the RZ display is 0000 000 000 101 001.

883. Verify that the REG SEL display is 0111 101 111 111 111.

884. Press the EXECUTE button.

885. Set the CHANNEL S switches to the 204 position.

886. Press the MONITOR indicator switch to the on (illuminated) position.

887. Set the INCREMENTS INHIBIT switch to the OFF position.

888. Set the INHIBIT INTERRUPT switch to the OFF position.

889. Set the T12 COUNTER STOP switch to the OFF position.

890. Press the RESET button on the FREQUENCY COUNTER.

891. Press the PROCEED button.

892. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

893. Set the T12 COUNTER STOP switch to the ON position.

894. Set the INCREMENTS INHIBIT switch to the ON position.

895. Set the INHIBIT INTERRUPT switch to the ON position.

896. Press the READ AGC indicator switch to the on (illuminated) position.

897. Press Keys CL, 0014.

898. Verify that the RZ display is 0000 000 000 001 100.

899. Press the CHANNEL button.

900. Press the EXECUTE button.

901. Verify that the OINC indicator is on.

902. Verify that BIT 14 of the REG SEL display is a "0". Stamp data sheet.

CDU-Z

903. Set the AGC INPUT COUNTERS switch to position 5.

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904. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

905. Press Keys CL, 00014, 10000.

906. Verify that the RZ display is 0000 000 000 001 100.

907. Verify that the REG SEL display is 0001 000 000 000 000.

908. Press the CHANNEL button.

909. Press the EXECUTE button.

910. Verify that the LINC indicator is on.

911. Press Keys CL, 00052, 75777.

912. Verify that the RZ display is 0000 000 000 101 010.

913. Verify that the REG SEL display is 0111 101 111 111 111.

914. Press the EXECUTE button.

915. Set the CHANNEL S switches to the 206 position.

916. Press the MONITOR indicator switch to the on (illuminated) position.

917. Set the INCREMENTS INHIBIT switch to the OFF position.

918. Set the INHIBIT INTERRUPT switch to the OFF position.

919. Set the T12 COUNTER STOP switch to the OFF position.

920. Press the RESET button on the FREQUENCY COUNTER.

921. Press the PROCEED button.

922. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

923. Set the T12 COUNTER STOP switch to the ON position.

924. Set the INCREMENTS INHIBIT switch to the ON position.

925. Set the INHIBIT INTERRUPT switch to the ON position.

926. Press the READ AGC indicator switch to the on (illuminated) position.

927. Press Keys CL, 0014.

928. Verify that the RZ display is 0000 000 000 001 100.

929. Press the CHANNEL button.

930. Press the EXECUTE button.

931. Verify that the OINC indicator is on.

932. Verify that BIT 13 of the REG SEL display is a "0". Stamp data sheet.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 5

JDC
NO. 05788
REV. B
INITIAL TDRR 35414

JOB CDU COUNTERS TEST

ASSEMBLY UNDER TEST
TITLE
SER. NO. DWG REV.

TEST HISTORY
DATE START END SITE / LOCATION
TIME START END TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME SER. NO. CAL DATE
NAME SER. NO. CAL DATE

CONDUCTED BY NAME/AFFILIATION
APPROVED BY NAME/AFFILIATION

Step	Parameter	Specification	Results
20.	RG Indication	0011 111 111 111 111	
22.	RG Indication	1100 000 000 000 000	
24.	RG Indication	1100 000 000 000 001	
28.	RG Indication	1100 000 000 000 000	
49.	RG Indication	0011 111 111 111 110	
55.	RG Indication	0011 111 111 111 110	
63.	RG Indication	0011 111 111 111 100	
69.	RG Indication	0011 111 111 111 111	
91.	RG Indication	0011 111 111 111 111	
93.	RG Indication	1100 000 000 000 000	
95.	RG Indication	1100 000 000 000 001	
99.	RG Indication	1100 000 000 000 000	
120.	RG Indication	0011 111 111 111 110	
126.	RG Indication	0011 111 111 111 110	
134.	RG Indication	0011 111 111 111 100	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 5

JDC
NO. 05788
REV. B

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
140.	RG Indication	0011 111 111 111 111	
162.	RG Indication	0011 111 111 111 111	
164.	RG Indication	1100 000 000 000 000	
166.	RG Indication	1100 000 000 000 001	
170.	RG Indication	1100 000 000 000 000	
191.	RG Indication	0011 111 111 111 110	
197.	RG Indication	0011 111 111 111 110	
205.	RG Indication	0011 111 111 111 100	
211.	RG Indication	0011 111 111 111 111	
233.	RG Indication	0011 111 111 111 111	
235.	RG Indication	1100 000 000 000 000	
237.	RG Indication	1100 000 000 000 001	
241.	RG Indication	1100 000 000 000 000	
262.	RG Indication	0011 111 111 111 110	
268.	RG Indication	0011 111 111 111 110	
276.	RG Indication	0011 111 111 111 100	
282.	RG Indication	0011 111 111 111 111	
304.	RG Indication	0011 111 111 111 111	
306.	RG Indication	1100 000 000 000 000	
308.	RG Indication	1100 000 000 000 001	
312.	RG Indication	1100 000 000 000 000	
333.	RG Indication	0011 111 111 111 110	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 5

JDC
NO. 05788
REV. B

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
339.	RG Indication	0011 111 111 111 110	
347.	RG Indication	0011 111 111 111 100	
353.	RG Indication	0011 111 111 111 111	
373.	REG SEL Indication	1111 111 111 111 111	
385.	REG SEL Indication	1101 010 101 010 101	
397.	REG SEL Indication	0000 000 000 000 000	
416.	FREQUENCY COUNTER Display	1024	
426.	REG SEL Indication	BIT 16 is a "0"	
445.	FREQUENCY COUNTER Display	1024	
455.	REG SEL Indication	BIT 16 is a "0"	
467.	REG SEL Indication	1111 111 111 111 111	
479.	REG SEL Indication	1101 010 101 010 101	
491.	REG SEL Indication	0000 000 000 000 000	
510.	FREQUENCY COUNTER Display	1024	
520.	REG SEL Indication	BIT 14 is a "0"	
539.	FREQUENCY COUNTER Display	1024	
549.	REG SEL Indication	BIT 14 is a "0"	
561.	REG SEL Indication	1111 111 111 111 111	
573.	REG SEL Indication	1101 010 101 010 101	
585.	REG SEL Indication	0000 000 000 000 000	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 5

JDC
NO. 05788
REV. B

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
604.	FREQUENCY COUNTER Display	1024	
614.	REG SEL Indication	BIT 13 is a "0"	
633.	FREQUENCY COUNTER Display	1024	
643.	REG SEL Indication	BIT 13 is a "0"	
657.	REG SEL Indication	1111 111 111 111 111	
669.	REG SEL Indication	1101 010 101 010 101	
681.	REG SEL Indication	0000 000 000 000 000	
702.	FREQUENCY COUNTER Display	1024	
712.	REG SEL Indication	BIT 12 is a "0"	
732.	FREQUENCY COUNTER Display	1024	
742.	REG SEL Indication	BIT 12 is a "0"	
754.	REG SEL Indication	1111 111 111 111 111	
766.	REG SEL Indication	1101 010 101 010 101	
778.	REG SEL Indication	0000 000 000 000 000	
799.	FREQUENCY COUNTER Display	1024	
809.	REG SEL Indication	BIT 11 is a "0"	
830.	FREQUENCY COUNTER Display	1024	
840.	REG SEL Indication	BIT 11 is a "0"	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 5

JDC
NO. 05788
REV. B

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
862.	FREQUENCY COUNTER Display	1024	______
872.	REG SEL Indication	BIT 15 is a "0"	______
892.	FREQUENCY COUNTER Display	1024	______
902.	REG SEL Indication	BIT 14 is a "0"	______
922.	FREQUENCY COUNTER Display	1024	______
932.	REG SEL Indication	BIT 13 is a "0"	______

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JOB CDU COUNTERS TEST | **JDC** 05788 **REV.** C **PAGE** 1 **OF** 28
INITIAL TDRR 35464 **D.S. PGS** 5

SUBSYSTEM Computer | **ASSY.** Block II C-Computer

DESCRIPTION

Tests the operation of the CDU input-output counters, and associated interface circuitry under normal and marginal input conditions.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	8-6-68	36667	19, 26	-	EA	-
B	10-17-68	36909	18, 21, 24, 25, 28	3, 4	EA	-
C	3-5-69	37385	12	-	EA	-

REFERENCES JDC's 05402, 05413, 05414, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set-up as specified in JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the XY Interface panel of the CTS.

CDU X INPUT TEST

3. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

4. Press Keys CL, 00032, 37776.

5. Verify that the RZ display is 0000 000 000 011 010.

6. Verify that the REG SEL display is 0011 111 111 111 110.

7. Press the EXECUTE button.

8. Verify that the LINC indicator is on.

9. Verify that the RG display is 0011 111 111 111 110.

10. Set the AGREEMENT A switches to XXXX 0032.

11. Press the MONITOR indicator switch to the on (illuminated) position.

12. Set the T12 COUNTER STOP switch to the OFF position.

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13. Set the INCREMENTS INHIBIT switch to the OFF position.

14. Set the AGC INPUT COUNTERS switch to position 3.

15. Press the POSITIVE indicator switch to the on (illuminated) position.

16. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

17. Set the Agreement A switch to SAMPLE.

18. Press the PROCEED button.

19. Press the SINGLE PULSE button.

20. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

21. Press the SINGLE PULSE button.

22. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

23. Press the SINGLE PULSE button.

24. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

25. Press the POSITIVE indicator switch to the off (extinguished) position.

26. Press the NEGATIVE indication switch to the on (illuminated) position.

27. Press the SINGLE PULSE button.

28. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

29. Press the SINGLE PULSE button twice.

30. Verify that the RG display is 0011 111 111 111 110.

31. Set the T12 COUNTER STOP switch to the ON position.

32. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

33. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

34. Press Keys CL, 00032, 37776.

35. Verify that the RZ display is 0000 000 000 011 010.

36. Verify that the REG SEL display is 0011 111 111 111 110.

37. Press the EXECUTE button.

38. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

39. Set the Y MARGINS switch to the V2 (High Zero) position.

40. Press the MONITOR indicator switch to the on (illuminated) position.

41. Press the NEGATIVE indicator switch to the off (extinguished) position.

42. Press the POSITIVE indicator switch to the on (illuminated) position.

43. Set the T12 COUNTER STOP switch to the OFF position.

44. Set the INCREMENTS INHIBIT switch to the OFF position.

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45. Press the PROCEED button.

46. Press the SINGLE PULSE button.

47. Verify that the RG display is 0011 111 111 111 110.

48. Press the SINGLE PULSE button.

49. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

50. Press the POSITIVE indicator switch to the off (extinguished) position.

51. Press the NEGATIVE indicator switch to the on (illuminated) position.

52. Press the SINGLE PULSE button.

53. Verify that the RG display is 0011 111 111 111 110.

54. Press the SINGLE PULSE button twice.

55. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

56. Set the T12 COUNTER STOP switch to the ON position.

57. Set the Y MARGINS switch to the V3 (Low One) position.

58. Set the T12 COUNTER STOP switch to the OFF position.

59. Press the PROCEED button.

60. Press the SINGLE PULSE button.

61. Verify that the RG display is 0011 111 111 111 101.

62. Press the SINGLE PULSE button.

63. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

64. Press the NEGATIVE indicator switch to the off (extinguished) position.

65. Press the POSITIVE indicator switch to the on (illuminated) position.

66. Press the SINGLE PULSE button.

67. Verify that the RG display is 0011 111 111 111 101.

68. Press the SINGLE PULSE button twice.

69. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

70. Set the T12 COUNTER STOP switch to the ON position.

71. Set the INCREMENTS INHIBIT switch to the ON position.

72. Set the Agreement A switch to the OFF position.

73. Set the Y MARGINS switch to the NORM position.

CDU Y INPUT TEST

74. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

75. Press Keys CL, 00033, 37776.

76. Verify that the RZ display is 0000 000 000 011 011.

77. Verify that the REG SEL display is 0011 111 111 111 110.

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78. Press the EXECUTE button.

79. Verify that the LINC indicator is on.

80. Verify that the RG display is 0011 111 111 111 110.

81. Set the AGREEMENT A switches to XXXX 0033.

82. Press the MONITOR indicator switch to the on (illuminated) position.

83. Set the T12 COUNTER STOP switch to the OFF position.

84. Set the INCREMENTS INHIBIT switch to the OFF position.

85. Set the AGC INPUT COUNTERS switch to position 4.

86. Press the POSITIVE indicator switch to the on (illuminated) position.

87. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

88. Set the Agreement A switch to SAMPLE.

89. Press the PROCEED button.

90. Press the SINGLE PULSE button.

91. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

92. Press the SINGLE PULSE button.

93. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

94. Press the SINGLE PULSE button.

95. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

96. Press the POSITIVE indicator switch to the off (extinguished) position.

97. Press the NEGATIVE indicator switch to the on (illuminated) position.

98. Press the SINGLE PULSE button.

99. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

100. Press the SINGLE PULSE button twice.

101. Verify that the RG display is 0011 111 111 111 110.

102. Set the T12 COUNTER STOP switch to the ON position.

103. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

104. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

105. Press Keys CL, 00033, 37776.

106. Verify that the RZ display is 0000 000 000 011 011.

107. Verify that the REG SEL display is 0011 111 111 111 110.

108. Press the EXECUTE button.

109. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

110. Set the Y MARGINS switch to the V2 (High Zero) position.

111. Press the MONITOR indicator switch to the on (illuminated) position.

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112. Press the NEGATIVE indicator switch to the off (extinguished) position.

113. Press the POSITIVE indicator switch to the on (illuminated) position.

114. Set the T12 COUNTER STOP switch to the OFF position.

115. Set the INCREMENTS INHIBIT switch to the OFF position.

116. Press the PROCEED button.

117. Press the SINGLE PULSE button.

118. Verify that the RG display is 0011 111 111 111 110.

119. Press the SINGLE PULSE button.

120. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

121. Press the POSITIVE indicator switch to the off (extinguished) position.

122. Press the NEGATIVE indicator switch to the on (illuminated) position.

123. Press the SINGLE PULSE button.

124. Verify that the RG display is 0011 111 111 111 110.

125. Press the SINGLE PULSE button twice.

126. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

127. Set the T12 COUNTER STOP switch to the ON position.

128. Set the Y MARGINS switch to the V3 (Low One) position.

129. Set the T12 COUNTER STOP switch to the OFF position.

130. Press the PROCEED button.

131. Press the SINGLE PULSE button.

132. Verify that the RG display is 0011 111 111 111 101.

133. Press the SINGLE PULSE button.

134. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

135. Press the NEGATIVE indicator switch to the off (extinguished) position.

136. Press the POSITIVE indicator switch to the on (illuminated) position.

137. Press the SINGLE PULSE button.

138. Verify that the RG display is 0011 111 111 111 101.

139. Press the SINGLE PULSE button twice.

140. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

141. Set the T12 COUNTER STOP switch to the ON position.

142. Set the INCREMENTS INHIBIT switch to the ON position.

143. Set the Agreement A switch to the OFF position.

144. Set the Y MARGINS switch to the NORM position.

CDU Z INPUT TEST

145. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

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146. Press Keys CL, 00034, 37776.

147. Verify that the RZ display is 0000 000 000 011 100.

148. Verify that the REG SEL display is 0011 111 111 111 110.

149. Press the EXECUTE button.

150. Verify that the LINC indicator is on.

151. Verify that the RG display is 0011 111 111 111 110.

152. Set the AGREEMENT A switches to XXXX 0034.

153. Press the MONITOR indicator switch to the on (illuminated) position.

154. Set the T12 COUNTER STOP switch to the OFF position.

155. Set the INCREMENTS INHIBIT switch to the OFF position.

156. Set the AGC INPUT COUNTERS switch to position 5.

157. Press the POSITIVE indicator switch to the on (illuminated) position.

158. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

159. Set the Agreement A switch to SAMPLE.

160. Press the PROCEED button.

161. Press the SINGLE PULSE button.

162. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

163. Press the SINGLE PULSE button.

164. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

165. Press the SINGLE PULSE button.

166. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

167. Press the POSITIVE indicator switch to the off (extinguished) position.

168. Press the NEGATIVE indicator switch to the on (illuminated) position.

169. Press the SINGLE PULSE button.

170. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

171. Press the SINGLE PULSE button twice.

172. Verify that the RG display is 0011 111 111 111 110.

173. Set the T12 COUNTER STOP switch to the ON position.

174. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

175. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

176. Press Keys CL, 00034, 37776.

177. Verify that the RZ display is 0000 000 000 011 100.

178. Verify that the REG SEL display is 0011 111 111 111 110.

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179. Press the EXECUTE button.

180. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

181. Set the Y MARGINS switch to the V2 (High Zero) position.

182. Press the MONITOR indicator switch to the on (illuminated) position.

183. Press the NEGATIVE indicator switch to the off (extinguished) position.

184. Press the POSITIVE indicator switch to the on (illuminated) position.

185. Set the T12 COUNTER STOP switch to the OFF position.

186. Set the INCREMENTS INHIBIT switch to the OFF position.

187. Press the PROCEED button.

188. Press the SINGLE PULSE button.

189. Verify that the RG display is 0011 111 111 111 110.

190. Press the SINGLE PULSE button.

191. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

192. Press the POSITIVE indicator switch to the off (extinguished) position.

193. Press the NEGATIVE indicator switch to the on (illuminated) position.

194. Press the SINGLE PULSE button.

195. Verify that the RG display is 0011 111 111 111 110.

196. Press the SINGLE PULSE button twice.

197. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

198. Set the T12 COUNTER STOP switch to the ON position.

199. Set the Y MARGINS switch to the V3 (Low One) position.

200. Set the T12 COUNTER STOP switch to the OFF position.

201. Press the PROCEED button.

202. Press the SINGLE PULSE button.

203. Verify that the RG display is 0011 111 111 111 101.

204. Press the SINGLE PULSE button.

205. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

206. Press the NEGATIVE indicator switch to the off (extinguished) position.

207. Press the POSITIVE indicator switch to the on (illuminated) position.

208. Press the SINGLE PULSE button.

209. Verify that the RG display is 0011 111 111 111 101.

210. Press the SINGLE PULSE button twice.

211. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

212. Set the T12 COUNTER STOP switch to the ON position.

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213. Set the INCREMENTS INHIBIT switch to the ON position.

214. Set the Agreement A switch to the OFF position.

215. Set the Y MARGINS switch to the NORM position.

CDU T INPUT TEST

216. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

217. Press Keys CL, 00035, 37776.

218. Verify that the RZ display is 0000 000 000 011 101.

219. Verify that the REG SEL display is 0011 111 111 111 110.

220. Press the EXECUTE button.

221. Verify that the LINC indicator is on.

222. Verify that the RG display is 0011 111 111 111 110.

223. Set the AGREEMENT A switches to XXXX 0035.

224. Press the MONITOR indicator switch to the on (illuminated) position.

225. Set the T12 COUNTER STOP switch to the OFF position.

226. Set the INCREMENTS INHIBIT switch to the OFF position.

227. Set the AGC INPUT COUNTERS switch to position 2.

228. Press the POSITIVE indicator switch to the on (illuminated) position.

229. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

230. Set the Agreement A switch to SAMPLE.

231. Press the PROCEED button.

232. Press the SINGLE PULSE button.

233. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

234. Press the SINGLE PULSE button.

235. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

236. Press the SINGLE PULSE button.

237. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

238. Press the POSITIVE indicator switch to the off (extinguished) position.

239. Press the NEGATIVE indicator switch to the on (illuminated) position.

240. Press the SINGLE PULSE button.

241. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

242. Press the SINGLE PULSE button twice.

243. Verify that the RG display is 0011 111 111 111 110.

244. Set the T12 COUNTER STOP switch to the ON position.

245. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

246. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

247. Press Keys CL, 00035, 37776.

248. Verify that the RZ display is 0000 000 000 011 101.

249. Verify that the REG SEL display is 0011 111 111 111 110.

250. Press the EXECUTE button.

251. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

252. Set the Y MARGINS switch to the V2 (High Zero) position.

253. Press the MONITOR indicator switch to the on (illuminated) position.

254. Press the NEGATIVE indicator switch to the off (extinguished) position.

255. Press the POSITIVE indicator switch to the on (illuminated) position.

256. Set the T12 COUNTER STOP switch to the OFF position.

257. Set the INCREMENTS INHIBIT switch to the OFF position.

258. Press the PROCEED button.

259. Press the SINGLE PULSE button.

260. Verify that the RG display is 0011 111 111 111 110.

261. Press the SINGLE PULSE button.

262. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

263. Press the POSITIVE indicator switch to the off (extinguished) position.

264. Press the NEGATIVE indicator switch to the on (illuminated) position.

265. Press the SINGLE PULSE button.

266. Verify that the RG display is 0011 111 111 111 110.

267. Press the SINGLE PULSE button twice.

268. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

269. Set the T12 COUNTER STOP switch to the ON position.

270. Set the Y MARGINS switch to the V3 (Low One) position.

271. Set the T12 COUNTER STOP switch to the OFF position.

272. Press the PROCEED button.

273. Press the SINGLE PULSE button.

274. Verify that the RG display is 0011 111 111 111 101.

275. Press the SINGLE PULSE button.

276. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

277. Press the NEGATIVE indicator switch to the off (extinguished) position.

278. Press the POSITIVE indicator switch to the on (illuminated) position.

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279. Press the SINGLE PULSE button.

280. Verify that the RG display is 0011 111 111 111 101.

→ 281. Press the SINGLE PULSE button twice.

282. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

283. Set the T12 COUNTER STOP switch to the ON position.

284. Set the INCREMENTS INHIBIT switch to the ON position.

285. Set the Agreement A switch to the OFF position.

286. Set the Y MARGINS switch to the NORM position.

CDU S INPUT TEST

287. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

288. Press Keys CL, 0036, 37776.

289. Verify that the RZ display is 0000 000 000 011 110.

290. Verify that the REG SEL display is 0011 111 111 111 110.

291. Press the EXECUTE button.

292. Verify that the LINC indicator is on.

293. Verify that the RG display is 0011 111 111 111 110.

→ 294. Set the AGREEMENT A switches to XXXX 0036.

295. Press the MONITOR indicator switch to the on (illuminated) position.

296. Set the T12 COUNTER STOP switch to the OFF position.

297. Set the INCREMENTS INHIBIT switch to the OFF position.

298. Set the AGC INPUT COUNTERS switch to position 1.

299. Press the POSITIVE indicator switch to the on (illuminated) position.

300. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

301. Set the Agreement A switch to SAMPLE.

302. Press the PROCEED button.

303. Press the SINGLE PULSE button.

304. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

305. Press the SINGLE PULSE button.

306. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

307. Press the SINGLE PULSE button.

308. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

309. Press the POSITIVE indicator switch to the off (extinguished) position.

310. Press the NEGATIVE indicator switch to the on (illuminated) position.

311. Press the SINGLE PULSE button.

312. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

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313. Press the SINGLE PULSE button twice.

314. Verify that the RG display is 0011 111 111 111 110.

315. Set the T12 COUNTER STOP switch to the ON position.

316. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

317. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

318. Press Keys CL, 00036, 37776.

319. Verify that the RZ display is 0000 000 000 011 110.

320. Verify that the REG SEL display is 0011 111 111 111 110.

321. Press the EXECUTE button.

322. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

323. Set the Y MARGINS switch to the V2 (High Zero) position.

324. Press the MONITOR indicator switch to the on (illuminated) position.

325. Press the NEGATIVE indicator switch to the off (extinguished) position.

326. Press the POSITIVE indicator switch to the on (illuminated) position.

327. Set the T12 COUNTER STOP switch to the OFF position.

328. Set the INCREMENTS INHIBIT switch to the OFF position.

329. Press the PROCEED button.

330. Press the SINGLE PULSE button.

331. Verify that the RG display is 0011 111 111 111 110.

332. Press the SINGLE PULSE button.

333. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

334. Press the POSITIVE indicator switch to the off (extinguished) position.

335. Press the NEGATIVE indicator switch to the on (illuminated) position.

336. Press the SINGLE PULSE button.

337. Verify that the RG display is 0011 111 111 111 110.

338. Press the SINGLE PULSE button twice.

339. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

340. Set the T12 COUNTER STOP switch to the ON position.

341. Set the Y MARGINS switch to the V3 (Low One) position.

342. Set the T12 COUNTER STOP switch to the OFF position.

343. Press the PROCEED button.

344. Press the SINGLE PULSE button

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345. Verify that the RG display is 0011 111 111 111 101.

346. Press the SINGLE PULSE button.

347. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

348. Press the NEGATIVE indicator switch to the off (extinguished) position.

349. Press the POSITIVE indicator switch to the on (illuminated) position.

350. Press the SINGLE PULSE button.

351. Verify that the RG display is 0011 111 111 111 101.

352. Press the SINGLE PULSE button twice.

353. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

354. Set the T12 COUNTER STOP switch to the ON position.

355. Set the INCREMENTS INHIBIT switch to the ON position.

356. Set the Agreement A switch to the OFF position.

357. Set the Y MARGINS switch to the NORM position.

CDU X OUTPUT TEST

358. Verify that the STRT1/STRT2 switch on the Buffer Circuit Assembly is in the OFF position.

359. Press the LOAD CHAN S 510 OHMS indicator switch to the on (illuminated) position.

360. Set the FREQ+ PHASE switch to the FRS S ⟶ T position.

361. Prepare the CTS FREQUENCY COUNTER for operation as specified in step 1 of JDC 05402.

361A. Set A SLOPE switch on CTS FREQUENCY COUNTER to + position.

> NOTE: During this test, the FREQUENCY COUNTER is to be operated as described under PROCEDURE on JDC 05402.

362. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

363. Press Keys CL, 00050, 77777.

364. Verify that the RZ display is 0000 000 000 101 000.

365. Verify that the REG SEL display is 0111 111 111 111 111.

366. Press the EXECUTE button.

367. Verify that the LINC indicator is on.

368. Press the READ AGC indicator switch to the on (illuminated) position.

369. Press Keys CL, 0050.

370. Verify that the RZ display is 0000 000 000 101 000.

371. Press the EXECUTE button.

372. Verify that the OINC indicator is on.

373. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet. ←

374. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

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375. Press Keys CL, 00050, 52525.

376. Verify that the RZ display is 0000 000 000 101 000.

377. Verify that the REG SEL display is 0101 010 101 010 101.

378. Press the EXECUTE button.

379. Verify that the LINC indicator is on.

380. Press the READ AGC indicator switch to the on (illuminated) position.

381. Press Keys CL, 0050.

382. Verify that the RZ display is 0000 000 000 101 000.

383. Press the EXECUTE button.

384. Verify that the OINC indicator is on.

385. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

386. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

387. Press Keys CL, 00050, 00000.

388. Verify that the RZ display is 0000 000 000 101 000.

389. Verify that the REG SEL display is 0000 000 000 000 000.

390. Press the EXECUTE button.

391. Verify that the LINC indicator is on.

392. Press the READ AGC indicator switch to the on (illuminated) position.

393. Press Keys CL, 0050.

394. Verify that the RZ display is 0000 000 000 101 000.

395. Press the EXECUTE button.

396. Verify that the OINC indicator is on.

397. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

398. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

399. Press Keys CL, 00014, 40000.

400. Verify that the RZ display is 0000 000 000 001 100.

401. Verify that the REG SEL display is 0100 000 000 000 000.

402. Press the CHANNEL button.

403. Press the EXECUTE button.

404. Verify that the LINC indicator is on.

405. Press Keys CL, 00050, 02000.

406. Verify that the RZ display is 0000 000 000 101 000.

407. Verify that the REG SEL display is 0000 010 000 000 000.

408. Press the EXECUTE button.

409. Set the CHANNEL S switches to the 201 position.

410. Set the INHIBIT INTERRUPT switch to the OFF position.

411. Press the MONITOR indicator switch to the on (illuminated) position, and set the AGC INPUT COUNTER switch to position 3.

position 3.

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412. Set the INCREMENTS INHIBIT switch to the OFF position.

413. Set the T12 COUNTER STOP switch to the OFF position.

414. Press the RESET button on the FREQUENCY COUNTER.

415. Press the PROCEED button.

416. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

417. Set the T12 COUNTER STOP switch to the ON position.

418. Set the INCREMENTS INHIBIT switch to the ON position.

419. Set the INHIBIT INTERRUPT switch to the ON position.

420. Press the READ AGC indicator switch to the on (illuminated) position.

421. Press Keys CL, 0014.

422. Verify that the RZ display is 0000 000 000 001 100.

423. Press the CHANNEL button.

424. Press the EXECUTE button.

425. Verify that the OINC indicator is on.

426. Verify that BIT 16 of the REG SEL display is a "0". Stamp data sheet.

427. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

428. Press Keys CL, 00014, 40000.

429. Verify that the RZ display is 0000 000 000 001 100.

430. Verify that the REG SEL display is 0100 000 000 000 000.

431. Press the CHANNEL button.

432. Press the EXECUTE button.

433. Verify that the LINC indicator is on.

434. Press Keys CL, 00050, 75777.

435. Verify that the RZ display is 0000 000 000 101 000.

436. Verify that the REG SEL display is 0111 101 111 111 111.

437. Press the EXECUTE button.

438. Set the CHANNEL S switches to the 202 position.

439. Press the MONITOR indicator switch to the on (illuminated) position.

440. Set the INCREMENTS INHIBIT switch to the OFF position.

441. Set the INHIBIT INTERRUPT switch to the OFF position.

442. Set the T12 COUNTER STOP switch to the OFF position.

443. Press the RESET button on the FREQUENCY COUNTER.

444. Press the PROCEED button.

445. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

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446. Set the T12 COUNTER STOP switch to the ON position.

447. Set the INCREMENTS INHIBIT switch to the ON position.

448. Set the INHIBIT INTERRUPT switch to the ON position.

449. Press the READ AGC indicator switch to the on (illuminated) position.

450. Press Keys CL, 0014.

451. Verify that the RZ display is 0000 000 000 001 100.

452. Press the CHANNEL button.

453. Press the EXECUTE button.

454. Verify that the OINC indicator is on.

455. Verify that BIT 16 of the REG SEL display is a "0". Stamp data sheet.

CDU Y OUTPUT TEST

456. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

457. Press Keys CL, 00051, 77777.

458. Verify that the RZ display is 0000 000 000 101 001.

459. Verify that the REG SEL display is 0111 111 111 111 111.

460. Press the EXECUTE button.

461. Verify that the LINC indicator is on.

462. Press the READ AGC indicator switch to the on (illuminated) position.

463. Press Keys CL, 0051.

464. Verify that the RZ display is 0000 000 000 101 001.

465. Press the EXECUTE button.

466. Verify that the OINC indicator is on.

467. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

468. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

469. Press Keys CL, 00051, 52525.

470. Verify that the RZ display is 0000 000 000 101 001.

471. Verify that the REG SEL display is 0101 010 101 010 101.

472. Press the EXECUTE button.

473. Verify that the LINC indicator is on.

474. Press the READ AGC indicator switch to the on (illuminated) position.

475. Press Keys CL, 0051.

476. Verify that the RZ display is 0000 000 000 101 001.

477. Press the EXECUTE button.

478. Verify that the OINC indicator is on.

479. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

480. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

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481. Press Keys CL, 00051, 00000.

482. Verify that the RZ display is 0000 000 000 101 001.

483. Verify that the REG SEL display is 0000 000 000 000 000.

484. Press the EXECUTE button.

485. Verify that the LINC indicator is on.

486. Press the READ AGC indicator switch to the on (illuminated) position.

487. Press Keys CL, 0051.

488. Verify that the RZ display is 0000 000 000 101 001.

489. Press the EXECUTE button.

490. Verify that the OINC indicator is on.

491. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

492. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

493. Press Keys CL, 00014, 20000.

494. Verify that the RZ display is 0000 000 000 001 100.

495. Verify that the REG SEL display is 0010 000 000 000 000.

496. Press the CHANNEL button.

497. Press the EXECUTE button.

498. Verify that the LINC indicator is on.

499. Press Keys CL, 00051, 02000.

500. Verify that the RZ display is 0000 000 000 101 001.

501. Verify that the REG SEL display is 0000 010 000 000 000.

502. Press the EXECUTE button.

503. Set the CHANNEL S switches to the 203 position.

504. Set the INHIBIT INTERRUPT switch to the OFF position.

505. Press the MONITOR indicator switch to the on (illuminated) position.

506. Set the INCREMENTS INHIBIT switch to the OFF position.

507. Set the T12 COUNTER STOP switch to the OFF position and set the AGC INPUT COUNTER switch to position 4.

508. Press the RESET button on the FREQUENCY COUNTER.

509. Press the PROCEED button.

510. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

511. Set the T12 COUNTER STOP switch to the ON position.

512. Set the INCREMENTS INHIBIT switch to the ON position.

513. Set the INHIBIT INTERRUPT switch to the ON position.

514. Press the READ AGC indicator switch to the on (illuminated) position.

515. Press Keys CL, 0014.

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516. Verify that the RZ display is 0000 000 000 001 100.

517. Press the CHANNEL button.

518. Press the EXECUTE button.

519. Verify that the OINC indicator is on.

520. Verify that BIT 14 of the REG SEL display is a "0". Stamp data sheet.

521. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

522. Press Keys CL, 00014, 20000.

523. Verify that the RZ display is 0000 000 000 001 100.

524. Verify that the REG SEL display is 0010 000 000 000 000.

525. Press the CHANNEL button.

526. Press the EXECUTE button.

527. Verify that the LINC indicator is on.

528. Press Keys CL, 00051, 75777.

529. Verify that the RZ display is 0000 000 000 101 001.

530. Verify that the REG SEL display is 0111 101 111 111 111.

531. Press the EXECUTE button.

532. Set the CHANNEL S switches to the 204 position.

533. Press the MONITOR indicator switch to the on (illuminated) position.

534. Set the INCREMENTS INHIBIT switch to the OFF position.

535. Set the INHIBIT INTERRUPT switch to the OFF position.

536. Set the T12 COUNTER STOP switch to the OFF position.

537. Press the RESET button on the FREQUENCY COUNTER.

538. Press the PROCEED button.

539. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

540. Set the T12 COUNTER STOP switch to the ON position.

541. Set the INCREMENTS INHIBIT switch to the ON position.

542. Set the INHIBIT INTERRUPT switch to the ON position.

543. Press the READ AGC indicator switch to the on (illuminated) position.

544. Press Keys CL, 0014.

545. Verify that the RZ display is 0000 000 000 001 100.

546. Press the CHANNEL button.

547. Press the EXECUTE button.

548. Verify that the OINC indicator is on.

549. Verify that BIT 14 of the REG SEL display is a "0". Stamp data sheet.

CDU Z OUTPUT TEST

550. Set the AGC INPUT COUNTERS switch to position 5, and press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

551. Press Keys CL, 00052, 77777.

Set the AGC INPUT [illegible] switch to position 5, [illegible]

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552. Verify that the RZ display is 0000 000 000 101 010.

553. Verify that the REG SEL display is 0111 111 111 111 111.

554. Press the EXECUTE button.

555. Verify that the LINC indicator is on.

556. Press the READ AGC indicator switch to the on (illuminated) position.

557. Press Keys CL, 0052.

558. Verify that the RZ display is 0000 000 000 101 010.

559. Press the EXECUTE button.

560. Verify that the OINC indicator is on.

561. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

562. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

563. Press Keys CL, 00052, 52525.

564. Verify that the RZ display is 0000 000 000 101 010.

565. Verify that the REG SEL display is 0101 010 101 010 101.

566. Press the EXECUTE button.

567. Verify that the LINC indicator is on.

568. Press the READ AGC indicator switch to the on (illuminated) position.

569. Press Keys CL, 0052.

570. Verify that the RZ display is 0000 000 000 101 010.

571. Press the EXECUTE button.

572. Verify that the OINC indicator is on.

573. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

574. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

575. Press Keys CL, 00052, 00000.

576. Verify that the RZ display is 0000 000 000 101 010.

577. Verify that the REG SEL display is 0000 000 000 000 000.

578. Press the EXECUTE button.

579. Verify that the LINC indicator is on.

580. Press the READ AGC indicator switch to the on (illuminated) position.

581. Press Keys CL, 0052.

582. Verify that the RZ display is 0000 000 000 101 010.

583. Press the EXECUTE button.

584. Verify that the OINC indicator is on.

585. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

586. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

587. Press Keys CL, 00014, 10000.

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588. Verify that the RZ display is 0000 000 000 001 100.

589. Verify that the REG SEL display is 0001 000 000 000 000.

590. Press the CHANNEL button.

591. Press the EXECUTE button.

592. Verify that the LINC indicator is on.

593. Press Keys CL, 00052, 02000.

594. Verify that the RZ display is 0000 000 000 101 010.

595. Verify that the REG SEL display is 0000 010 000 000 000.

596. Press the EXECUTE button.

597. Set the CHANNEL S switches to the 205 position.

598. Set the INHIBIT INTERRUPT switch to the OFF position.

599. Press the MONITOR indicator switch to the on (illuminated) position.

600. Set the INCREMENTS INHIBIT switch to the OFF position.

601. Set the T12 COUNTER STOP switch to the OFF position.

602. Press the RESET button on the FREQUENCY COUNTER.

603. Press the PROCEED button.

604. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

605. Set the T12 COUNTER STOP switch to the ON position.

606. Set the INCREMENTS INHIBIT switch to the ON position.

607. Set the INHIBIT INTERRUPT switch to the ON position.

608. Press the READ AGC indicator switch to the on (illuminated) position.

609. Press Keys CL, 0014.

610. Verify that the RZ display is 0000 000 000 001 100.

611. Press the CHANNEL button.

612. Press the EXECUTE button.

613. Verify that the OINC indicator is on.

614. Verify that BIT 13 of the REG SEL display is a "0". Stamp data sheet.

615. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

616. Press Keys CL, 00014, 10000.

617. Verify that the RZ display is 0000 000 000 001 100.

618. Verify that the REG SEL display is 0001 000 000 000 000.

619. Press the CHANNEL button.

620. Press the EXECUTE button.

621. Verify that the LINC indicator is on.

622. Press Keys CL, 00052, 75777.

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623. Verify that the RZ display is 0000 000 000 101 010.

624. Verify that the REG SEL display is 0111 101 111 111 111.

625. Press the EXECUTE button.

626. Set the CHANNEL S switches to the 206 position.

627. Press the MONITOR indicator switch to the on (illuminated) position.

628. Set the INCREMENTS INHIBIT switch to the OFF position.

629. Set the INHIBIT INTERRUPT switch to the OFF position.

630. Set the T12 COUNTER STOP switch to the OFF position.

631. Press the RESET button on the FREQUENCY COUNTER.

632. Press the PROCEED button.

633. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

634. Set the T12 COUNTER STOP switch to the ON position.

635. Set the INCREMENTS INHIBIT switch to the ON position.

636. Set the INHIBIT INTERRUPT switch to the ON position.

637. Press the READ AGC indicator switch to the on (illuminated) position.

638. Press Keys CL, 0014.

639. Verify that the RZ display is 0000 000 000 001 100.

640. Press the CHANNEL button.

641. Press the EXECUTE button.

642. Verify that the OINC indicator is on.

643. Verify that BIT 13 of the REG SEL display is a "0". Stamp data sheet.

CDU T OUTPUT TEST

644. Set the CHANNEL S switches to position 101.

645. Press the LOAD CHAN T 510 OHMS switch to the on (illuminated) position.

646. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

647. Press Keys CL, 00053, 77777.

648. Verify that the RZ display is 0000 000 000 101 011.

649. Verify that the REG SEL display is 0111 111 111 111 111.

650. Press the EXECUTE button.

651. Verify that the LINC indicator is on.

652. Press the READ AGC indicator switch to the on (illuminated) position.

653. Press Keys CL, 0053.

654. Verify that the RZ display is 0000 000 000 101 011.

655. Press the EXECUTE button.

656. Verify that the OINC indicator is on.

657. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

658. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

659. Press Keys CL, 00053, 52525.

660. Verify that the RZ display is 0000 000 000 101 011.

661. Verify that the REG SEL display is 0101 010 101 010 101.

662. Press the EXECUTE button.

663. Verify that the LINC indicator is on.

664. Press the READ AGC indicator switch to the on (illuminated) position.

665. Press Keys CL, 0053.

666. Verify that the RZ display is 0000 000 000 101 011.

667. Press the EXECUTE button.

668. Verify that the OINC indicator is on.

669. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

670. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

671. Press Keys CL, 00053, 00000.

672. Verify that the RZ display is 0000 000 000 101 011.

673. Verify that the REG SEL display is 0000 000 000 000 000.

674. Press the EXECUTE button.

675. Verify that the LINC indicator is on.

676. Press the READ AGC indicator switch to the on (illuminated) position.

677. Press Keys CL, 0053.

678. Verify that the RZ display is 0000 000 000 101 011.

679. Press the EXECUTE button.

680. Verify that the OINC indicator is on.

681. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

682. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

683. Press Keys CL, 00014, 04000.

684. Verify that the RZ display is 0000 000 000 001 100.

685. Verify that the REG SEL display is 0000 100 000 000 000.

686. Press the CHANNEL button.

687. Press the EXECUTE button.

688. Verify that the LINC indicator is on.

689. Press Keys CL, 00053, 02000.

690. Verify that the RZ display is 0000 000 000 101 011.

691. Verify that the REG SEL display is 0000 010 000 000 000.

692. Press the EXECUTE button.

693. Set the CHANNEL T switches to the 203 position.

694. Set the FREQ+ PHASE switch to the FRT T → S position.

695. Set the INHIBIT INTERRUPT switch to the OFF position.

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696. Press the MONITOR indicator switch to the on (illuminated) position.

697. Set the AGC INPUT COUNTERS switch to position 2.

698. Set the INCREMENTS INHIBIT switch to the OFF position.

699. Set the T12 COUNTER STOP switch to the OFF position.

700. Press the RESET button on the FREQUENCY COUNTER.

701. Press the PROCEED button.

702. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

703. Set the T12 COUNTER STOP switch to the ON position.

704. Set the INCREMENTS INHIBIT switch to the ON position.

705. Set the INHIBIT INTERRUPT switch to the ON position.

706. Press the READ AGC indicator switch to the on (illuminated) position.

707. Press Keys CL, 0014.

708. Verify that the RZ display is 0000 000 000 001 100.

709. Press the CHANNEL button.

710. Press the EXECUTE button.

711. Verify that the OINC indicator is on.

712. Verify that BIT 12 of the REG SEL display is a "0". Stamp data sheet.

713. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

714. Press Keys CL, 00014, 04000.

715. Verify that the RZ display is 0000 000 000 001 100.

716. Verify that the REG SEL display is 0000 100 000 000 000.

717. Press the CHANNEL button.

718. Press the EXECUTE button.

719. Verify that the LINC indicator is on.

720. Press Keys CL, 00053, 75777.

721. Verify that the RZ display is 0000 000 000 101 011.

722. Verify that the REG SEL display is 0111 101 111 111 111.

723. Press the EXECUTE button.

724. Set the CHANNEL T switches to the 204 position.

725. Press the POSITIVE indicator switch to the off position, and press the NEGATIVE indicator switch to the on (illuminated) position.

726. Press the MONITOR indicator switch to the on (illuminated) position.

727. Set the INCREMENTS INHIBIT switch to the OFF position.

728. Set the INHIBIT INTERRUPT switch to the OFF position.

729. Set the T12 COUNTER STOP switch to the OFF position.

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730. Press the RESET button on the FREQUENCY COUNTER.

731. Press the PROCEED button.

732. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

733. Set the T12 COUNTER STOP switch to the ON position.

734. Set the INCREMENTS INHIBIT switch to the ON position.

735. Set the INHIBIT INTERRUPT switch to the ON position.

736. Press the READ AGC indicator switch to the on (illuminated) position.

737. Press Keys CL, 0014.

738. Verify that the RZ display is 0000 000 000 001 100.

739. Press the CHANNEL button.

740. Press the EXECUTE button.

741. Verify that the OINC indicator is on.

742. Verify that BIT 12 of the REG SEL display is a "0". Stamp data sheet.

CDU S OUTPUT TEST

743. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

744. Press Keys CL, 00054, 77777.

745. Verify that the RZ display is 0000 000 000 101 100.

746. Verify that the REG SEL display is 0111 111 111 111 111.

747. Press the EXECUTE button.

748. Verify that the LINC indicator is on.

749. Press the READ AGC indicator switch to the on (illuminated) position.

750. Press Keys CL, 0054.

751. Verify that the RZ display is 0000 000 000 101 100.

752. Press the EXECUTE button.

753. Verify that the OINC indicator is on.

754. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

755. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

756. Press Keys CL, 00054, 52525.

757. Verify that the RZ display is 0000 000 000 101 100.

758. Verify that the REG SEL display is 0101 010 101 010 101.

759. Press the EXECUTE button.

760. Verify that the LINC indicator is on.

761. Press the READ AGC indicator switch to the on (illuminated) position.

762. Press Keys CL, 0054.

763. Verify that the RZ display is 0000 000 000 101 100.

764. Press the EXECUTE button.

765. Verify that the OINC indicator is on.

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766. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

767. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

768. Press Keys CL, 00054, 00000.

769. Verify that the RZ display is 0000 000 000 101 100.

770. Verify that the REG SEL display is 0000 000 000 000 000.

771. Press the EXECUTE button.

772. Verify that the LINC indicator is on.

773. Press the READ AGC indicator switch to the on (illuminated) position.

774. Press Keys CL, 0054.

775. Verify that the RZ display is 0000 000 000 101 100.

776. Press the EXECUTE button.

777. Verify that the OINC indicator is on.

778. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

779. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

780. Set the AGC INPUT COUNTER switch to position 1.

781. Press Keys CL, 00014, 02000.

782. Verify that the RZ display is 0000 000 000 001 100.

783. Verify that the REG SEL display is 0000 010 000 000 000.

784. Press the CHANNEL button.

785. Press the EXECUTE button.

786. Verify that the LINC indicator is on.

787. Press Keys CL, 00054, 02000.

788. Verify that the RZ display is 0000 000 000 101 100.

789. Verify that the REG SEL display is 0000 010 000 000 000.

790. Press the EXECUTE button.

791. Set the CHANNEL T switches to the 201 position.

792. Set the INHIBIT INTERRUPT switch to the OFF position.

793. Press the MONITOR indicator switch to the on (illuminated) position.

794. Set the INCREMENTS INHIBIT switch to the OFF position.

795. Set the T12 COUNTER STOP switch to the OFF position.

796. Press the NEGATIVE indicator switch to the off position, and press the POSITIVE indicator switch to the on position.

797. Press the RESET button on the FREQUENCY COUNTER.

798. Press the PROCEED button.

799. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

800. Set the T12 COUNTER STOP switch to the ON position.

801. Set the INCREMENTS INHIBIT switch to the ON position.

802. Set the INHIBIT INTERRUPT switch to the ON position.

803. Press the READ AGC indicator switch to the on (illuminated) position.

804. Press Keys CL, 0014.

805. Verify that the RZ display is 0000 000 000 001 100.

806. Press the CHANNEL button.

807. Press the EXECUTE button.

808. Verify that the OINC indicator is on.

809. Verify that BIT 11 of the REG SEL display is a "0". Stamp data sheet.

810. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

811. Press Keys CL, 00014, 02000.

812. Verify that the RZ display is 0000 000 000 001 100.

813. Verify that the REG SEL display is 0000 010 000 000 000.

814. Press the CHANNEL button.

815. Press the EXECUTE button.

816. Verify that the LINC indicator is on.

817. Press Keys CL, 00054, 75777.

818. Verify that the RZ display is 0000 000 000 101 100.

819. Verify that the REG SEL display is 0111 101 111 111 111.

820. Press the EXECUTE button.

821. Set the CHANNEL T switches to the 202 position.

822. Press the MONITOR indicator switch to the on (illuminated) position.

823. Set the AGC INPUT COUNTERS to position 1.

824. Press the NEGATIVE indicator switch to the on position (illuminated), and press the POSITIVE indicator switch to the off position (not illuminated).

825. Set the INCREMENTS INHIBIT switch to the OFF position.

826. Set the INHIBIT INTERRUPT switch to the OFF position.

827. Set the T12 COUNTER STOP switch to the OFF position.

828. Press the RESET button on the FREQUENCY COUNTER.

829. Press the PROCEED button.

830. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

831. Set the T12 COUNTER STOP switch to the ON position.

832. Set the INCREMENTS INHIBIT switch to the ON position.

833. Set the INHIBIT INTERRUPT switch to the ON position.

834. Press the READ AGC indicator switch to the on (illuminated) position.

835. Press Keys CL, 0014.

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836. Verify that the RZ display is 0000 000 000 001 100.

837. Press the CHANNEL button.

838. Press the EXECUTE button.

839. Verify that the OINC indicator is on.

840. Verify that BIT 11 of the REG SEL display is a "0". Stamp data sheet.

841. Set the CHANNEL T switches to position 101.

842. Set the FREQ + PHASE switch to the FRS S → T position.

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843. Set the AGC INPUT COUNTERS switch to position 3.

844. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

845. Press Keys CL, 00014, 40000.

846. Verify that the RZ display is 0000 000 000 001 100.

847. Verify that the REG SEL display is 0100 000 000 000 000.

848. Press the CHANNEL button.

849. Press the EXECUTE button.

850. Verify that the LINC indicator is on.

851. Press Keys CL, 00050, 75777.

852. Verify that the RZ display is 0000 000 000 101 000.

853. Verify that the REG SEL display is 0111 101 111 111 111.

854. Press the EXECUTE button.

855. Set the CHANNEL S switches to the 202 position.

856. Press the MONITOR indicator switch to the on (illuminated) position.

857. Set the INCREMENTS INHIBIT switch to the OFF position.

858. Set the INHIBIT INTERRUPT switch to the OFF position.

859. Set the T12 COUNTER STOP switch to the OFF position.

860. Press the RESET button on the FREQUENCY COUNTER.

861. Press the PROCEED button.

862. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

863. Set the T12 COUNTER STOP switch to the ON position.

864. Set the INCREMENTS INHIBIT switch to the ON position.

865. Set the INHIBIT INTERRUPT switch to the ON position.

866. Press the READ AGC indicator switch to the on (illuminated) position.

867. Press Keys CL, 0014.

868. Verify that the RZ display is 0000 000 000 001 100.

869. Press the CHANNEL button.

870. Press the EXECUTE button.

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871. Verify that the OINC incidator is on.

872. Verify that BIT 15 of the REG SEL display is a "0". Stamp data sheet.

CDU-Y

873. Set the AGC INPUT COUNTERS switch to position 4.

874. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

875. Press Keys CL, 00014, 20000.

876. Verify that the RZ display is 0000 000 000 001 100.

877. Verify that the REG SEL display is 0010 000 000 000 000.

878. Press the CHANNEL button.

879. Press the EXECUTE button.

880. Verify that the LINC indicator is on.

881. Press Keys CL, 00051, 75777.

882. Verify that the RZ display is 0000 000 000 101 001.

883. Verify that the REG SEL display is 0111 101 111 111 111.

884. Press the EXECUTE button.

885. Set the CHANNEL S switches to the 204 position.

886. Press the MONITOR indicator switch to the on (illuminated) position.

887. Set the INCREMENTS INHIBIT switch to the OFF position.

888. Set the INHIBIT INTERRUPT switch to the OFF position.

889. Set the T12 COUNTER STOP switch to the OFF position.

890. Press the RESET button on the FREQUENCY COUNTER.

891. Press the PROCEED button.

892. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

893. Set the T12 COUNTER STOP switch to the ON position.

894. Set the INCREMENTS INHIBIT switch to the ON position.

895. Set the INHIBIT INTERRUPT switch to the ON position.

896. Press the READ AGC indicator switch to the on (illuminated) position.

897. Press Keys CL, 0014.

898. Verify that the RZ display is 0000 000 000 001 100.

899. Press the CHANNEL button.

900. Press the EXECUTE button.

901. Verify that the OINC indicator is on.

902. Verify that BIT 14 of the REG SEL display is a "0". Stamp data sheet.

CDU-Z

903. Set the AGC INPUT COUNTERS switch to position 5.

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904. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

905. Press Keys CL, 00014, 10000.

906. Verify that the RZ display is 0000 000 000 001 100.

907. Verify that the REG SEL display is 0001 000 000 000 000.

908. Press the CHANNEL button.

909. Press the EXECUTE button.

910. Verify that the LINC indicator is on.

911. Press Keys CL, 00052, 75777.

912. Verify that the RZ display is 0000 000 000 101 010.

913. Verify that the REG SEL display is 0111 101 111 111 111.

914. Press the EXECUTE button.

915. Set the CHANNEL S switches to the 206 position.

916. Press the MONITOR indicator switch to the on (illuminated) position.

917. Set the INCREMENTS INHIBIT switch to the OFF position.

918. Set the INHIBIT INTERRUPT switch to the OFF position.

919. Set the T12 COUNTER STOP switch to the OFF position.

920. Press the RESET button on the FREQUENCY COUNTER.

921. Press the PROCEED button.

922. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

923. Set the T12 COUNTER STOP switch to the ON position.

924. Set the INCREMENTS INHIBIT switch to the ON position.

925. Set the INHIBIT INTERRUPT switch to the ON position.

926. Press the READ AGC indicator switch to the on (illuminated) position.

927. Press Keys CL, 0014.

928. Verify that the RZ display is 0000 000 000 001 100.

929. Press the CHANNEL button.

930. Press the EXECUTE button.

931. Verify that the OINC indicator is on.

932. Verify that BIT 13 of the REG SEL display is a "0". Stamp data sheet.

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APOLLO G&N
EQUIPMENT TEST 5
DATA SHEET 1 OF 5

JDC
NO. 05788
REV. C
INITIAL TDRR 35464

JOB CDU COUNTERS TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION   APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
20.	RG Indication	0011 111 111 111 111	
22.	RG Indication	1100 000 000 000 000	
24.	RG Indication	1100 000 000 000 001	
28.	RG Indication	1100 000 000 000 000	
49.	RG Indication	0011 111 111 111 110	
55.	RG Indication	0011 111 111 111 110	
63.	RG Indication	0011 111 111 111 100	
69.	RG Indication	0011 111 111 111 111	
91.	RG Indication	0011 111 111 111 111	
93.	RG Indication	1100 000 000 000 000	
95.	RG Indication	1100 000 000 000 001	
99.	RG Indication	1100 000 000 000 000	
120.	RG Indication	0011 111 111 111 110	
126.	RG Indication	0011 111 111 111 110	
134.	RG Indication	0011 111 111 111 100	

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APOLLO G&N
EQUIPMENT TEST 5
DATA SHEET 2 OF 5

JDC
NO. 05788
REV. C

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
140.	RG Indication	0011 111 111 111 111	
162.	RG Indication	0011 111 111 111 111	
164.	RG Indication	1100 000 000 000 000	
166.	RG Indication	1100 000 000 000 001	
170.	RG Indication	1100 000 000 000 000	
191.	RG Indication	0011 111 111 111 110	
197.	RG Indication	0011 111 111 111 110	
205.	RG Indication	0011 111 111 111 100	
211.	RG Indication	0011 111 111 111 111	
233.	RG Indication	0011 111 111 111 111	
235.	RG Indication	1100 000 000 000 000	
237.	RG Indication	1100 000 000 000 001	
241.	RG Indication	1100 000 000 000 000	
262.	RG Indication	0011 111 111 111 110	
268.	RG Indication	0011 111 111 111 110	
276.	RG Indication	0011 111 111 111 100	
282.	RG Indication	0011 111 111 111 111	
304.	RG Indication	0011 111 111 111 111	
306.	RG Indication	1100 000 000 000 000	
308.	RG Indication	1100 000 000 000 001	
312.	RG Indication	1100 000 000 000 000	
333.	RG Indication	0011 111 111 111 110	

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APOLLO G&N
EQUIPMENT TEST 5
DATA SHEET 3 OF 5

JDC
NO. 05788
REV. C

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
339.	RG Indication	0011 111 111 111 110	
347.	RG Indication	0011 111 111 111 100	
353.	RG Indication	0011 111 111 111 111	
373.	REG SEL Indication	1111 111 111 111 111	
385.	REG SEL Indication	1101 010 101 010 101	
397.	REG SEL Indication	0000 000 000 000 000	
416.	FREQUENCY COUNTER Display	1024	
426.	REG SEL Indication	BIT 16 is a "0"	
445.	FREQUENCY COUNTER Display	1024	
455.	REG SEL Indication	BIT 16 is a "0"	
467.	REG SEL Indication	1111 111 111 111 111	
479.	REG SEL Indication	1101 010 101 010 101	
491.	REG SEL Indication	0000 000 000 000 000	
510.	FREQUENCY COUNTER Display	1024	
520.	REG SEL Indication	BIT 14 is a "0"	
539.	FREQUENCY COUNTER Display	1024	
549.	REG SEL Indication	BIT 14 is a "0"	
561.	REG SEL Indication	1111 111 111 111 111	
573.	REG SEL Indication	1101 010 101 010 101	
585.	REG SEL Indication	0000 000 000 000 000	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 5

JDC
NO. 05788
REV. C

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
604.	FREQUENCY COUNTER Display	1024	
614.	REG SEL Indication	BIT 13 is a "0"	
633.	FREQUENCY COUNTER Display	1024	
643.	REG SEL Indication	BIT 13 is a "0"	
657.	REG SEL Indication	1111 111 111 111 111	
669.	REG SEL Indication	1101 010 101 010 101	
681.	REG SEL Indication	0000 000 000 000 000	
702.	FREQUENCY COUNTER Display	1024	
712.	REG SEL Indication	BIT 12 is a "0"	
732.	FREQUENCY COUNTER Display	1024	
742.	REG SEL Indication	BIT 12 is a "0"	
754.	REG SEL Indication	1111 111 111 111 111	
766.	REG SEL Indication	1101 010 101 010 101	
778.	REG SEL Indication	0000 000 000 000 000	
799.	FREQUENCY COUNTER Display	1024	
809.	REG SEL Indication	BIT 11 is a "0"	
830.	FREQUENCY COUNTER Display	1024	
840.	REG SEL Indication	BIT 11 is a "0"	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 5

JDC
NO. 05788
REV. C

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
862.	FREQUENCY COUNTER Display	1024	
872.	REG SEL Indication	BIT 15 is a "0"	
892.	FREQUENCY COUNTER Display	1024	
902.	REG SEL Indication	BIT 14 is a "0"	
922.	FREQUENCY COUNTER Display	1024	
932.	REG SEL Indication	BIT 13 is a "0"	

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JOB CDU COUNTERS TEST

JDC 05788 **REV.** ____ **PAGE** 1 **OF** 28
INITIAL TDRR 35464 **D.S. PGS** 5

SUBSYSTEM Computer
ASSY. Block II C-Computer

DESCRIPTION

Tests the operation of the CDU input-output counters, and associated interface circuitry under normal and marginal input conditions.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC's 05402, 05413, 05414, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set-up as specified in JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the XY Interface panel of the CTS.

CDU X INPUT TEST

3. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

4. Press Keys CL, 00032, 37776.

5. Verify that the RZ display is 0000 000 000 011 010.

6. Verify that the REG SEL display is 0011 111 111 111 110.

7. Press the EXECUTE button.

8. Verify that the LINC indicator is on.

9. Verify that the RG display is 0011 111 111 111 110.

10. Set the AGREEMENT A switches to XXXX 0032.

11. Press the MONITOR indicator switch to the on (illuminated) position.

12. Set the T12 COUNTER STOP switch to the OFF position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB CDU COUNTERS TEST
JDC 05788 **REV** **PAGE** 2 **OF** 28
SUBSYSTEM Computer
ASSY Block II C-Computer

13. Set the INCREMENTS INHIBIT switch to the OFF position.

14. Set the AGC INPUT COUNTERS switch to position 3.

15. Press the POSITIVE indicator switch to the on (illuminated) position.

16. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

17. Set the Agreement A switch to SAMPLE.

18. Press the PROCEED button.

19. Press the SINGLE PULSE button.

20. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

21. Press the SINGLE PULSE button.

22. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

23. Press the SINGLE PULSE button.

24. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

25. Press the POSITIVE indicator switch to the off (extinguished) position.

26. Press the NEGATIVE indication switch to the on (illuminated) position.

27. Press the SINGLE PULSE button.

28. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

29. Press the SINGLE PULSE button twice.

30. Verify that the RG display is 0011 111 111 111 110.

31. Set the T12 COUNTER STOP switch to the ON position.

32. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

33. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

34. Press Keys CL, 00032, 37776.

35. Verify that the RZ display is 0000 000 000 011 010.

36. Verify that the REG SEL display is 0011 111 111 111 110.

37. Press the EXECUTE button.

38. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

39. Set the Y MARGINS switch to the V2 (High Zero) position.

40. Press the MONITOR indicator switch to the on (illuminated) position.

41. Press the NEGATIVE indicator switch to the off (extinguished) position.

42. Press the POSITIVE indicator switch to the on (illuminated) position.

43. Set the T12 COUNTER STOP switch to the OFF position.

44. Set the INCREMENTS INHIBIT switch to the OFF position.

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JOB CDU COUNTERS TEST
JDC 05788 **REV** **PAGE** 3 **OF** 28
SUBSYSTEM Computer
ASSY Block II C-Computer

45. Press the PROCEED button.

46. Press the SINGLE PULSE button.

47. Verify that the RG display is 0011 111 111 111 110.

48. Press the SINGLE PULSE button.

49. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

50. Press the POSITIVE indicator switch to the off (extinguished) position.

51. Press the NEGATIVE indicator switch to the on (illuminated) position.

52. Press the SINGLE PULSE button.

53. Verify that the RG display is 0011 111 111 111 110.

54. Press the SINGLE PULSE button twice.

55. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

56. Set the T12 COUNTER STOP switch to the ON position.

57. Set the Y MARGINS switch to the V3 (Low One) position.

58. Set the T12 COUNTER STOP switch to the OFF position.

59. Press the PROCEED button.

60. Press the SINGLE PULSE button.

61. Verify that the RG display is 0011 111 111 111 101.

62. Press the SINGLE PULSE button.

63. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

64. Press the NEGATIVE indicator switch to the off (extinguished) position.

65. Press the POSITIVE indicator switch to the on (illuminated) position.

66. Press the SINGLE PULSE button.

67. Verify that the RG display is 0011 111 111 111 101.

68. Press the SINGLE PULSE button twice.

69. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

70. Set the T12 COUNTER STOP switch to the ON position.

71. Set the INCREMENTS INHIBIT switch to the ON position.

72. Set the Agreement A switch to the OFF position.

73. Set the Y MARGINS switch to the NORM position.

CDU Y INPUT TEST

74. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

75. Press Keys CL, 00033, 37776.

76. Verify that the RZ display is 0000 000 000 011 011.

77. Verify that the REG SEL display is 0011 111 111 111 110.

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JOB CDU COUNTERS TEST
JDC 05788 **REV** **PAGE** 4 **OF** 28
SUBSYSTEM Computer
ASSY Block II C-Computer

78. Press the EXECUTE button.

79. Verify that the LINC indicator is on.

80. Verify that the RG display is 0011 111 111 111 110.

81. Set the AGREEMENT A switches to XXXX 0033.

82. Press the MONITOR indicator switch to the on (illuminated) position.

83. Set the T12 COUNTER STOP switch to the OFF position.

84. Set the INCREMENTS INHIBIT switch to the OFF position.

85. Set the AGC INPUT COUNTERS switch to position 4.

86. Press the POSITIVE indicator switch to the on (illuminated) position.

87. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

88. Set the Agreement A switch to SAMPLE.

89. Press the PROCEED button.

90. Press the SINGLE PULSE button.

91. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

92. Press the SINGLE PULSE button.

93. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

94. Press the SINGLE PULSE button.

95. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

96. Press the POSITIVE indicator switch to the off (extinguished) position.

97. Press the NEGATIVE indicator switch to the on (illuminated) position.

98. Press the SINGLE PULSE button.

99. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

100. Press the SINGLE PULSE button twice.

101. Verify that the RG display is 0011 111 111 111 110.

102. Set the T12 COUNTER STOP switch to the ON position.

103. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

104. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

105. Press Keys CL, 00033, 37776.

106. Verify that the RZ display is 0000 000 000 011 011.

107. Verify that the REG SEL display is 0011 111 111 111 110.

108. Press the EXECUTE button.

109. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

110. Set the Y MARGINS switch to the V2 (High Zero) position.

111. Press the MONITOR indicator switch to the on (illuminated) position.

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112. Press the NEGATIVE indicator switch to the off (extinguished) position.

113. Press the POSITIVE indicator switch to the on (illuminated) position.

114. Set the T12 COUNTER STOP switch to the OFF position.

115. Set the INCREMENTS INHIBIT switch to the OFF position.

116. Press the PROCEED button.

117. Press the SINGLE PULSE button.

118. Verify that the RG display is 0011 111 111 111 110.

119. Press the SINGLE PULSE button.

120. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

121. Press the POSITIVE indicator switch to the off (extinguished) position.

122. Press the NEGATIVE indicator switch to the on (illuminated) position.

123. Press the SINGLE PULSE button.

124. Verify that the RG display is 0011 111 111 111 110.

125. Press the SINGLE PULSE button twice.

126. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

127. Set the T12 COUNTER STOP switch to the ON position.

128. Set the Y MARGINS switch to the V3 (Low One) position.

129. Set the T12 COUNTER STOP switch to the OFF position.

130. Press the PROCEED button.

131. Press the SINGLE PULSE button.

132. Verify that the RG display is 0011 111 111 111 101.

133. Press the SINGLE PULSE button.

134. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

135. Press the NEGATIVE indicator switch to the off (extinguished) position.

136. Press the POSITIVE indicator switch to the on (illuminated) position.

137. Press the SINGLE PULSE button.

138. Verify that the RG display is 0011 111 111 111 101.

139. Press the SINGLE PULSE button twice.

140. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

141. Set the T12 COUNTER STOP switch to the ON position.

142. Set the INCREMENTS INHIBIT switch to the ON position.

143. Set the Agreement A switch to the OFF position.

144. Set the Y MARGINS switch to the NORM position.

CDU Z INPUT TEST

145. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

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146. Press Keys CL, 00034, 37776.

147. Verify that the RZ display is 0000 000 000 011 100.

148. Verify that the REG SEL display is 0011 111 111 111 110.

149. Press the EXECUTE button.

150. Verify that the LINC indicator is on.

151. Verify that the RG display is 0011 111 111 111 110.

152. Set the AGREEMENT A switches to XXXX 0034.

153 Press the MONITOR indicator switch to the on (illuminated) position.

154. Set the T12 COUNTER STOP switch to the OFF position.

155. Set the INCREMENTS INHIBIT switch to the OFF position.

156. Set the AGC INPUT COUNTERS switch to position 5.

157. Press the POSITIVE indicator switch to the on (illuminated) position.

158. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

159. Set the Agreement A switch to SAMPLE.

160. Press the PROCEED button.

161. Press the SINGLE PULSE button.

162. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

163. Press the SINGLE PULSE button.

164. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

165. Press the SINGLE PULSE button.

166. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

167. Press the POSITIVE indicator switch to the off (extinguished) position.

168. Press the NEGATIVE indicator switch to the on (illuminated) position.

169. Press the SINGLE PULSE button.

170. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

171. Press the SINGLE PULSE button twice.

172. Verify that the RG display is 0011 111 111 111 110.

173. Set the T12 COUNTER STOP switch to the ON position.

174. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

175. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

176. Press Keys CL, 00034, 37776.

177. Verify that the RZ display is 0000 000 000 011 100.

178. Verify that the REG SEL display is 0011 111 111 111 110.

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179. Press the EXECUTE button.

180. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

181. Set the Y MARGINS switch to the V2 (High Zero) position.

182. Press the MONITOR indicator switch to the on (illuminated) position.

183. Press the NEGATIVE indicator switch to the off (extinguished) position.

184. Press the POSITIVE indicator switch to the on (illuminated) position.

185. Set the T12 COUNTER STOP switch to the OFF position.

186. Set the INCREMENTS INHIBIT switch to the OFF position.

187. Press the PROCEED button.

188. Press the SINGLE PULSE button.

189. Verify that the RG display is 0011 111 111 111 110.

190. Press the SINGLE PULSE button.

191. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

192. Press the POSITIVE indicator switch to the off (extinguished) position.

193. Press the NEGATIVE indicator switch to the on (illuminated) position.

194. Press the SINGLE PULSE button.

195. Verify that the RG display is 0011 111 111 111 110.

196. Press the SINGLE PULSE button twice.

197. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

198. Set the T12 COUNTER STOP switch to the ON position.

199. Set the Y MARGINS switch to the V3 (Low One) position.

200. Set the T12 COUNTER STOP switch to the OFF position.

201. Press the PROCEED button.

202. Press the SINGLE PULSE button.

203. Verify that the RG display is 0011 111 111 111 101.

204. Press the SINGLE PULSE button.

205. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

206. Press the NEGATIVE indicator switch to the off (extinguished) position.

207. Press the POSITIVE indicator switch to the on (illuminated) position.

208. Press the SINGLE PULSE button.

209. Verify that the RG display is 0011 111 111 111 101.

210. Press the SINGLE PULSE button twice.

211. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

212. Set the T12 COUNTER STOP switch to the ON position.

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213. Set the INCREMENTS INHIBIT switch to the ON position.

214. Set the Agreement A switch to the OFF position.

215. Set the Y MARGINS switch to the NORM position.

CDU T INPUT TEST

216. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

217. Press Keys CL, 00035, 37776.

218. Verify that the RZ display is 0000 000 000 011 101.

219. Verify that the REG SEL display is 0011 111 111 111 110.

220. Press the EXECUTE button.

221. Verify that the LINC indicator is on.

222. Verify that the RG display is 0011 111 111 111 110.

223. Set the AGREEMENT A switches to XXXX 0035.

224. Press the MONITOR indicator switch to the on (illuminated) position.

225. Set the T12 COUNTER STOP switch to the OFF position.

226. Set the INCREMENTS INHIBIT switch to the OFF position.

227. Set the AGC INPUT COUNTERS switch to position 2.

228. Press the POSITIVE indicator switch to the on (illuminated) position.

229. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

230. Set the Agreement A switch to SAMPLE.

231. Press the PROCEED button.

232. Press the SINGLE PULSE button.

233. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

234. Press the SINGLE PULSE button.

235. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

236. Press the SINGLE PULSE button.

237. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

238. Press the POSITIVE indicator switch to the off (extinguished) position.

239. Press the NEGATIVE indicator switch to the on (illuminated) position.

240. Press the SINGLE PULSE button.

241. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

242. Press the SINGLE PULSE button twice.

243. Verify that the RG display is 0011 111 111 111 110.

244. Set the T12 COUNTER STOP switch to the ON position.

245. Set the INCREMENTS INHIBIT switch to the ON position.

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Input Margins

246. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

247. Press Keys CL, 00035, 37776.

248. Verify that the RZ display is 0000 000 000 011 101.

249. Verify that the REG SEL display is 0011 111 111 111 110.

250. Press the EXECUTE button.

251. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

252. Set the Y MARGINS switch to the V2 (High Zero) position.

253. Press the MONITOR indicator switch to the on (illuminated) position.

254. Press the NEGATIVE indicator switch to the off (extinguished) position.

255. Press the POSITIVE indicator switch to the on (illuminated) position.

256. Set the T12 COUNTER STOP switch to the OFF position.

257. Set the INCREMENTS INHIBIT switch to the OFF position.

258. Press the PROCEED button.

259. Press the SINGLE PULSE button.

260. Verify that the RG display is 0011 111 111 111 110.

261. Press the SINGLE PULSE button.

262. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

263. Press the POSITIVE indicator switch to the off (extinguished) position.

264. Press the NEGATIVE indicator switch to the on (illuminated) position.

265. Press the SINGLE PULSE button.

266. Verify that the RG display is 0011 111 111 111 110.

267. Press the SINGLE PULSE button twice.

268. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

269. Set the T12 COUNTER STOP switch to the ON position.

270. Set the Y MARGINS switch to the V3 (Low One) position.

271. Set the T12 COUNTER STOP switch to the OFF position.

272. Press the PROCEED button.

273. Press the SINGLE PULSE button.

274. Verify that the RG display is 0011 111 111 111 101.

275. Press the SINGLE PULSE button.

276. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

277. Press the NEGATIVE indicator switch to the off (extinguished) position.

278. Press the POSITIVE indicator switch to the on (illuminated) position.

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279. Press the SINGLE PULSE button.

280. Verify that the RG display is 0011 111 111 111 101.

281. Press the SINGLE PULSE button twice.

282. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

283. Set the T12 COUNTER STOP switch to the ON position.

284. Set the INCREMENTS INHIBIT switch to the ON position.

285. Set the Agreement A switch to the OFF position.

286. Set the Y MARGINS switch to the NORM position.

CDU S INPUT TEST

287. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

288. Press Keys CL, 0036, 37776.

289. Verify that the RZ display is 0000 000 000 011 110.

290. Verify that the REG SEL display is 0011 111 111 111 110.

291. Press the EXECUTE button.

292. Verify that the LINC indicator is on.

293. Verify that the RG display is 0011 111 111 111 110.

294. Set the AGREEMENT A switches to XXXX 0036.

295. Press the MONITOR indicator switch to the on (illuminated) position.

296. Set the T12 COUNTER STOP switch to the OFF position.

297. Set the INCREMENTS INHIBIT switch to the OFF position.

298. Set the AGC INPUT COUNTERS switch to position 1.

299. Press the POSITIVE indicator switch to the on (illuminated) position.

300. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

301. Set the Agreement A switch to SAMPLE.

302. Press the PROCEED button.

303. Press the SINGLE PULSE button.

304. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

305. Press the SINGLE PULSE button.

306. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

307. Press the SINGLE PULSE button.

308. Verify that the RG display is 1100 000 000 000 001. Stamp data sheet.

309. Press the POSITIVE indicator switch to the off (extinguished) position.

310. Press the NEGATIVE indicator switch to the on (illuminated) position.

311. Press the SINGLE PULSE button.

312. Verify that the RG display is 1100 000 000 000 000. Stamp data sheet.

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313. Press the SINGLE PULSE button twice.

314. Verify that the RG display is 0011 111 111 111 110.

315. Set the T12 COUNTER STOP switch to the ON position.

316. Set the INCREMENTS INHIBIT switch to the ON position.

Input Margins

317. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

318. Press Keys CL, 00036, 37776.

319. Verify that the RZ display is 0000 000 000 011 110.

320. Verify that the REG SEL display is 0011 111 111 111 110.

321. Press the EXECUTE button.

322. Verify that the RG display is 0011 111 111 111 110 and the LINC indicator is on.

323. Set the Y MARGINS switch to the V2 (High Zero) position.

324. Press the MONITOR indicator switch to the on (illuminated) position.

325. Press the NEGATIVE indicator switch to the off (extinguished) position.

326. Press the POSITIVE indicator switch to the on (illuminated) position.

327. Set the T12 COUNTER STOP switch to the OFF position.

328. Set the INCREMENTS INHIBIT switch to the OFF position.

329. Press the PROCEED button.

330. Press the SINGLE PULSE button.

331. Verify that the RG display is 0011 111 111 111 110.

332. Press the SINGLE PULSE button.

333. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

334. Press the POSITIVE indicator switch to the off (extinguished) position.

335. Press the NEGATIVE indicator switch to the on (illuminated) position.

336. Press the SINGLE PULSE button.

337. Verify that the RG display is 0011 111 111 111 110.

338. Press the SINGLE PULSE button twice.

339. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

340. Set the T12 COUNTER STOP switch to the ON position.

341. Set the Y MARGINS switch to the V3 (Low One) position.

342. Set the T12 COUNTER STOP switch to the OFF position.

343. Press the PROCEED button.

344. Press the SINGLE PULSE button.

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345. Verify that the RG display is 0011 111 111 111 101.

346. Press the SINGLE PULSE button.

347. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

348. Press the NEGATIVE indicator switch to the off (extinguished) position.

349. Press the POSITIVE indicator switch to the on (illuminated) position.

350. Press the SINGLE PULSE button.

351. Verify that the RG display is 0011 111 111 111 101.

352. Press the SINGLE PULSE button twice.

353. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

354. Set the T12 COUNTER STOP switch to the ON position.

355. Set the INCREMENTS INHIBIT switch to the ON position.

356. Set the Agreement A switch to the OFF position.

357. Set the Y MARGINS switch to the NORM position.

CDU X OUTPUT TEST

358. Verify that the STRT1/STRT2 switch on the Buffer Circuit Assembly is in the OFF position.

359. Press the LOAD CHAN S 510 OHMS indicator switch to the on (illuminated) position.

360. Set the FREQ + PHASE switch to the FRS S → T position.

361. Prepare the CTS FREQUENCY COUNTER for operation as specified in step 1 of JDC 05402.

> NOTE: During this test, the FREQUENCY COUNTER is to be operated as described under PROCEDURE on JDC 05402.

362. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

363. Press Keys CL, 00050, 77777.

364. Verify that the RZ display is 0000 000 000 101 000.

365. Verify that the REG SEL display is 0111 111 111 111 111.

366. Press the EXECUTE button.

367. Verify that the LINC indicator is on.

368. Press the READ AGC indicator switch to the on (illuminated) position.

369. Press Keys CL, 0050.

370. Verify that the RZ display is 0000 000 000 101 000.

371. Press the EXECUTE button.

372. Verify that the OINC indicator is on.

373. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

374. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

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SUBSYSTEM Computer | **ASSY** Block II C-Computer

375. Press Keys CL, 00050, 52525.

376. Verify that the RZ display is 0000 000 000 101 000.

377. Verify that the REG SEL display is 0101 010 101 010 101.

378. Press the EXECUTE button.

379. Verify that the LINC indicator is on.

380. Press the READ AGC indicator switch to the on (illuminated) position.

381. Press Keys CL, 0050.

382. Verify that the RZ display is 0000 000 000 101 000.

383. Press the EXECUTE button.

384. Verify that the OINC indicator is on.

385. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

386. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

387. Press Keys CL, 00050, 00000.

388. Verify that the RZ display is 0000 000 000 101 000.

389. Verify that the REG SEL display is 0000 000 000 000 000.

390. Press the EXECUTE button.

391. Verify that the LINC indicator is on.

392. Press the READ AGC indicator switch to the on (illuminated) position.

393. Press Keys CL, 0050.

394. Verify that the RZ display is 0000 000 000 101 000.

395. Press the EXECUTE button.

396. Verify that the OINC indicator is on.

397. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

398. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

399. Press Keys CL, 00014, 40000.

400. Verify that the RZ display is 0000 000 000 001 100.

401. Verify that the REG SEL display is 0100 000 000 000 000.

402. Press the CHANNEL button.

403. Press the EXECUTE button.

404. Verify that the LINC indicator is on.

405. Press Keys CL, 00050, 02000.

406. Verify that the RZ display is 0000 000 000 101 000.

407. Verify that the REG SEL display is 0000 010 000 000 000.

408. Press the EXECUTE button.

409. Set the CHANNEL 8 switches to the 201 position.

410. Set the INHIBIT INTERRUPT switch to the OFF position.

411. Press the MONITOR indicator switch to the on (illuminated) position, and set the AGC INPUT COUNTER switch to position 3.

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SUBSYSTEM Computer | **ASSY** Block II C-Computer

412. Set the INCREMENTS INHIBIT switch to the OFF position.

413. Set the T12 COUNTER STOP switch to the OFF position.

414. Press the RESET button on the FREQUENCY COUNTER.

415. Press the PROCEED button.

416. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

417. Set the T12 COUNTER STOP switch to the ON position.

418. Set the INCREMENTS INHIBIT switch to the ON position.

419. Set the INHIBIT INTERRUPT switch to the ON position.

420. Press the READ AGC indicator switch to the on (illuminated) position.

421. Press Keys CL, 0014.

422. Verify that the RZ display is 0000 000 000 001 100.

423. Press the CHANNEL button.

424. Press the EXECUTE button.

425. Verify that the OINC indicator is on.

426. Verify that BIT 16 of the REG SEL display is a "0". Stamp data sheet.

427. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

428. Press Keys CL, 00014, 40000.

429. Verify that the RZ display is 0000 000 000 001 100.

430. Verify that the REG SEL display is 0100 000 000 000 000.

431. Press the CHANNEL button.

432. Press the EXECUTE button.

433. Verify that the LINC indicator is on.

434. Press Keys CL, 00050, 75777.

435. Verify that the RZ display is 0000 000 000 101 000.

436. Verify that the REG SEL display is 0111 101 111 111 111.

437. Press the EXECUTE button.

438. Set the CHANNEL 8 switches to the 202 position.

439. Press the MONITOR indicator switch to the on (illuminated) position.

440. Set the INCREMENTS INHIBIT switch to the OFF position.

441. Set the INHIBIT INTERRUPT switch to the OFF position.

442. Set the T12 COUNTER STOP switch to the OFF position.

443. Press the RESET button on the FREQUENCY COUNTER.

444. Press the PROCEED button.

445. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

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SUBSYSTEM Computer | **ASSY** Block II C-Computer

446. Set the T12 COUNTER STOP switch to the ON position.

447. Set the INCREMENTS INHIBIT switch to the ON position.

448. Set the INHIBIT INTERRUPT switch to the ON position.

449. Press the READ AGC indicator switch to the on (illuminated) position.

450. Press Keys CL, 0014.

451. Verify that the RZ display is 0000 000 000 001 100.

452. Press the CHANNEL button.

453. Press the EXECUTE button.

454. Verify that the OINC indicator is on.

455. Verify that BIT 16 of the REG SEL display is a "0". Stamp data sheet.

CDU Y OUTPUT TEST

456. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

457. Press Keys CL, 00051, 77777.

458. Verify that the RZ display is 0000 000 000 101 001.

459. Verify that the REG SEL display is 0111 111 111 111 111.

460. Press the EXECUTE button.

461. Verify that the LINC indicator is on.

462. Press the READ AGC indicator switch to the on (illuminated) position.

463. Press Keys CL, 0051.

464. Verify that the RZ display is 0000 000 000 101 001.

465. Press the EXECUTE button.

466. Verify that the OINC indicator is on.

467. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

468. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

469. Press Keys CL, 00051, 52525.

470. Verify that the RZ display is 0000 000 000 101 001.

471. Verify that the REG SEL display is 0101 010 101 010 101.

472. Press the EXECUTE button.

473. Verify that the LINC indicator is on.

474. Press the READ AGC indicator switch to the on (illuminated) position.

475. Press Keys CL, 0051.

476. Verify that the RZ display is 0000 000 000 101 001.

477. Press the EXECUTE button.

478. Verify that the OINC indicator is on.

479. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

480. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

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SUBSYSTEM Computer | **ASSY** Block II C-Computer

481. Press Keys CL, 00051, 00000.

482. Verify that the RZ display is 0000 000 000 101 001.

483. Verify that the REG SEL display is 0000 000 000 000 000.

484. Press the EXECUTE button.

485. Verify that the LINC indicator is on.

486. Press the READ AGC indicator switch to the on (illuminated) position.

487. Press Keys CL, 0051.

488. Verify that the RZ display is 0000 000 000 101 001.

489. Press the EXECUTE button.

490. Verify that the OINC indicator is on.

491. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

492. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

493. Press Keys CL, 00014, 20000.

494. Verify that the RZ display is 0000 000 000 001 100.

495. Verify that the REG SEL display is 0010 000 000 000 000.

496. Press the CHANNEL button.

497. Press the EXECUTE button.

498. Verify that the LINC indicator is on.

499. Press Keys CL, 00051, 02000.

500. Verify that the RZ display is 0000 000 000 101 001.

501. Verify that the REG SEL display is 0000 010 000 000 000.

502. Press the EXECUTE button.

503. Set the CHANNEL 8 switches to the 203 position.

504. Set the INHIBIT INTERRUPT switch to the OFF position.

505. Press the MONITOR indicator switch to the on (illuminated) position.

506. Set the INCREMENTS INHIBIT switch to the OFF position.

507. Set the T12 COUNTER STOP switch to the OFF position and set the AGC INPUT COUNTER switch to position 4.

508. Press the RESET button on the FREQUENCY COUNTER.

509. Press the PROCEED button.

510. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

511. Set the T12 COUNTER STOP switch to the ON position.

512. Set the INCREMENTS INHIBIT switch to the ON position.

513. Set the INHIBIT INTERRUPT switch to the ON position.

514. Press the READ AGC indicator switch to the on (illuminated) position.

515. Press Keys CL, 0014.

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516. Verify that the RZ display is 0000 000 000 001 100.

517. Press the CHANNEL button.

518. Press the EXECUTE button.

519. Verify that the OINC indicator is on.

520. Verify that BIT 14 of the REG SEL display is a "0". Stamp data sheet.

521. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

522. Press Keys CL, 00014, 20000.

523. Verify that the RZ display is 0000 000 000 001 100.

524. Verify that the REG SEL display is 0010 000 000 000 000.

525. Press the CHANNEL button.

526. Press the EXECUTE button.

527. Verify that the LINC indicator is on.

528. Press Keys CL, 00051, 75777.

529. Verify that the RZ display is 0000 000 000 101 001.

530. Verify that the REG SEL display is 0111 101 111 111 111.

531. Press the EXECUTE button.

532. Set the CHANNEL S switches to the 204 position.

533. Press the MONITOR indicator switch to the on (illuminated) position.

534. Set the INCREMENTS INHIBIT switch to the OFF position.

535. Set the INHIBIT INTERRUPT switch to the OFF position.

536. Set the T12 COUNTER STOP switch to the OFF position.

537. Press the RESET button on the FREQUENCY COUNTER.

538. Press the PROCEED button.

539. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

540. Set the T12 COUNTER STOP switch to the ON position.

541. Set the INCREMENTS INHIBIT switch to the ON position.

542. Set the INHIBIT INTERRUPT switch to the ON position.

543. Press the READ AGC indicator switch to the on (illuminated) position.

544. Press Keys CL, 0014.

545. Verify that the RZ display is 0000 000 000 001 100.

546. Press the CHANNEL button.

547. Press the EXECUTE button.

548. Verify that the OINC indicator is on.

549. Verify that BIT 14 of the REG SEL display is a "0". Stamp data sheet.

CDU Z OUTPUT TEST

550. Set the AGC INPUT COUNTERS switch to position 5, and press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

551. Press Keys CL, 00052, 77777.

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552. Verify that the RZ display is 0000 000 000 101 010.

553. Verify that the REG SEL display is 0111 111 111 111 111.

554. Press the EXECUTE button.

555. Verify that the LINC indicator is on.

556. Press the READ AGC indicator switch to the on (illuminated) position.

557. Press Keys CL, 0052.

558. Verify that the RZ display is 0000 000 000 101 010.

559. Press the EXECUTE button.

560. Verify that the OINC indicator is on.

561. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

562. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

563. Press Keys CL, 00052, 52525.

564. Verify that the RZ display is 0000 000 000 101 010.

565. Verify that the REG SEL display is 0101 010 101 010 101.

566. Press the EXECUTE button.

567. Verify that the LINC indicator is on.

568. Press the READ AGC indicator switch to the on (illuminated) position.

569. Press Keys CL, 0052.

570. Verify that the RZ display is 0000 000 000 101 010.

571. Press the EXECUTE button.

572. Verify that the OINC indicator is on.

573. Verify that the REG SEL display is 1001 010 101 010 101. Stamp data sheet.

574. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

575. Press Keys CL, 00052, 00000.

576. Verify that the RZ display is 0000 000 000 101 010.

577. Verify that the REG SEL display is 0000 000 000 000 000.

578. Press the EXECUTE button.

579. Verify that the LINC indicator is on.

580. Press the READ AGC indicator switch to the on (illuminated) position.

581. Press Keys CL, 0052.

582. Verify that the RZ display is 0000 000 000 101 010.

583. Press the EXECUTE button.

584. Verify that the OINC indicator is on.

585. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

586. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

587. Press Keys CL, 00014, 10000.

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588. Verify that the RZ display is 0000 000 000 001 100.

589. Verify that the REG SEL display is 0001 000 000 000 000.

590. Press the CHANNEL button.

591. Press the EXECUTE button.

592. Verify that the LINC indicator is on.

593. Press Keys CL, 00052, 02000.

594. Verify that the RZ display is 0000 000 000 101 010.

595. Verify that the REG SEL display is 0000 010 000 000 000.

596. Press the EXECUTE button.

597. Set the CHANNEL S switches to the 205 position.

598. Set the INHIBIT INTERRUPT switch to the on (illuminated) position.

599. Press the MONITOR indicator switch to the on (illuminated) position.

600. Set the INCREMENTS INHIBIT switch to the OFF position.

601. Set the T12 COUNTER STOP switch to the OFF position.

602. Press the RESET button on the FREQUENCY COUNTER.

603. Press the PROCEED button.

604. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

605. Set the T12 COUNTER STOP switch to the ON position.

606. Set the INCREMENTS INHIBIT switch to the ON position.

607. Set the INHIBIT INTERRUPT switch to the ON position.

608. Press the READ AGC indicator switch to the on (illuminated) position.

609. Press Keys CL, 0014.

610. Verify that the RZ display is 0000 000 000 001 100.

611. Press the CHANNEL button.

612. Press the EXECUTE button.

613. Verify that the OINC indicator is on.

614. Verify that BIT 13 of the REG SEL display is a "0". Stamp data sheet.

615. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

616. Press Keys CL, 00014, 10000.

617. Verify that the RZ display is 0000 000 000 001 100.

618. Verify that the REG SEL display is 0001 000 000 000 000.

619. Press the CHANNEL button.

620. Press the EXECUTE button.

621. Verify that the LINC indicator is on.

622. Press Keys CL, 00052, 75777.

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623. Verify that the RZ display is 0000 000 000 101 010.

624. Verify that the REG SEL display is 0111 101 111 111 111.

625. Press the EXECUTE button.

626. Set the CHANNEL S switches to the 206 position.

627. Press the MONITOR indicator switch to the on (illuminated) position.

628. Set the INCREMENTS INHIBIT switch to the OFF position.

629. Set the INHIBIT INTERRUPT switch to the OFF position.

630. Set the T12 COUNTER STOP switch to the OFF position.

631. Press the RESET button on the FREQUENCY COUNTER.

632. Press the PROCEED button.

633. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

634. Set the T12 COUNTER STOP switch to the ON position.

635. Set the INCREMENTS INHIBIT switch to the ON position.

636. Set the INHIBIT INTERRUPT switch to the ON position.

637. Press the READ AGC indicator switch to the on (illuminated) position.

638. Press Keys CL, 0014.

639. Verify that the RZ display is 0000 000 000 001 100.

640. Press the CHANNEL button.

641. Press the EXECUTE button.

642. Verify that the OINC indicator is on.

643. Verify that BIT 13 of the REG SEL display is a "0". Stamp data sheet.

CDU T OUTPUT TEST

644. Set the CHANNEL S switches to position 101.

645. Press the LOAD CHAN T 510 OHMS switch to the on (illuminated) position.

646. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

647. Press Keys CL, 00053, 77777.

648. Verify that the RZ display is 0000 000 000 101 011.

649. Verify that the REG SEL display is 0111 111 111 111 111.

650. Press the EXECUTE button.

651. Verify that the LINC indicator is on.

652. Press the READ AGC indicator switch to the on (illuminated) position.

653. Press Keys CL, 0053.

654. Verify that the RZ display is 0000 000 000 101 011.

655. Press the EXECUTE button.

656. Verify that the OINC indicator is on.

657. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

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658. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

659. Press Keys CL, 00053, 52525.

660. Verify that the RZ display is 0000 000 000 101 011.

661. Verify that the REG SEL display is 0101 010 101 010 101.

662. Press the EXECUTE button.

663. Verify that the LINC indicator is on.

664. Press the READ AGC indicator switch to the on (illuminated) position.

665. Press Keys CL, 0053.

666. Verify that the RZ display is 0000 000 000 101 011.

667. Press the EXECUTE button.

668. Verify that the OINC indicator is on.

669. Verify that the REG SEL display is 1001 010 101 010 101. Stamp data sheet.

670. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

671. Press Keys CL, 00053, 00000.

672. Verify that the RZ display is 0000 000 000 101 011.

673. Verify that the REG SEL display is 0000 000 000 000 000.

674. Press the EXECUTE button.

675. Verify that the LINC indicator is on.

676. Press the READ AGC indicator switch to the on (illuminated) position.

677. Press Keys CL, 0053.

678. Verify that the RZ display is 0000 000 000 101 011.

679. Press the EXECUTE button.

680. Verify that the OINC indicator is on.

681. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

682. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

683. Press Keys CL, 00014, 04000.

684. Verify that the RZ display is 0000 000 000 001 100.

685. Verify that the REG SEL display is 0000 100 000 000 000.

686. Press the CHANNEL button.

687. Press the EXECUTE button.

688. Verify that the LINC indicator is on.

689. Press Keys CL, 00053, 02000.

690. Verify that the RZ display is 0000 000 000 101 011.

691. Verify that the REG SEL display is 0000 010 000 000 000.

692. Press the EXECUTE button.

693. Set the CHANNEL T switches to the 203 position.

694. Set the FREQ+.PHASE switch to the FRT T → S position.

695. Set the INHIBIT INTERRUPT switch to the OFF position.

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696. Press the MONITOR indicator switch to the on (illuminated) position.

697. Set the AGC INPUT COUNTERS switch to position 2.

698. Set the INCREMENTS INHIBIT switch to the OFF position.

699. Set the T12 COUNTER STOP switch to the OFF position.

700. Press the RESET button on the FREQUENCY COUNTER.

701. Press the PROCEED button.

702. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

703. Set the T12 COUNTER STOP switch to the ON position.

704. Set the INCREMENTS INHIBIT switch to the ON position.

705. Set the INHIBIT INTERRUPT switch to the ON position.

706. Press the READ AGC indicator switch to the on (illuminated) position.

707. Press Keys CL, 0014.

708. Verify that the RZ display is 0000 000 000 001 100.

709. Press the CHANNEL button.

710. Press the EXECUTE button.

711. Verify that the OINC indicator is on.

712. Verify that BIT 12 of the REG SEL display is a "0". Stamp data sheet.

713. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

714. Press Keys CL, 00014, 04000.

715. Verify that the RZ display is 0000 000 000 001 100.

716. Verify that the REG SEL display is 0000 100 000 000 000.

717. Press the CHANNEL button.

718. Press the EXECUTE button.

719. Verify that the LINC indicator is on.

720. Press Keys CL, 00053, 75777.

721. Verify that the RZ display is 0000 000 000 101 011.

722. Verify that the REG SEL display is 0111 101 111 111 111.

723. Press the EXECUTE button.

724. Set the CHANNEL T switches to the 204 position.

725. Press the POSITIVE indicator switch to the off position, and press the NEGATIVE indicator switch to the on (illuminated) position.

726. Press the MONITOR indicator switch to the on (illuminated) position.

727. Set the INCREMENTS INHIBIT switch to the OFF position.

728. Set the INHIBIT INTERRUPT switch to the OFF position.

729. Set the T12 COUNTER STOP switch to the OFF position.

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730. Press the RESET button on the FREQUENCY COUNTER.

731. Press the PROCEED button.

732. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

733. Set the T12 COUNTER STOP switch to the ON position.

734. Set the INCREMENTS INHIBIT switch to the ON position.

735. Set the INHIBIT INTERRUPT switch to the ON position.

736. Press the READ AGC indicator switch to the on (illuminated) position.

737. Press Keys CL, 0014.

738. Verify that the RZ display is 0000 000 000 001 100.

739. Press the CHANNEL button.

740. Press the EXECUTE button.

741. Verify that the OINC indicator is on.

742. Verify that BIT 12 of the REG SEL display is a "0". Stamp data sheet.

CDU S OUTPUT TEST

743. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

744. Press Keys CL, 00054, 77777.

745. Verify that the RZ display is 0000 000 000 101 100.

746. Verify that the REG SEL display is 0111 111 111 111 111.

747. Press the EXECUTE button.

748. Verify that the LINC indicator is on.

749. Press the READ AGC indicator switch to the on (illuminated) position.

750. Press Keys CL, 0054.

751. Verify that the RZ display is 0000 000 000 101 100.

752. Press the EXECUTE button.

753. Verify that the OINC indicator is on.

754. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

755. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

756. Press Keys CL, 00054, 52525.

757. Verify that the RZ display is 0000 000 000 101 100.

758. Verify that the REG SEL display is 0101 010 101 010 101.

759. Press the EXECUTE button.

760. Verify that the LINC indicator is on.

761. Press the READ AGC indicator switch to the on (illuminated) position.

762. Press Keys CL, 0054.

763. Verify that the RZ display is 0000 000 000 101 100.

764. Press the EXECUTE button.

765. Verify that the OINC indicator is on.

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766. Verify that the REG SEL display is 1001 010 101 010 101. Stamp data sheet.

767. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

768. Press Keys CL, 00054, 00000.

769. Verify that the RZ display is 0000 000 000 101 100.

770. Verify that the REG SEL display is 0000 000 000 000 000.

771. Press the EXECUTE button.

772. Verify that the LINC indicator is on.

773. Press the READ AGC indicator switch to the on (illuminated) position.

774. Press Keys CL, 0054.

775. Verify that the RZ display is 0000 000 000 101 100.

776. Press the EXECUTE button.

777. Verify that the OINC indicator is on.

778. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

779. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

780. Set the AGC INPUT COUNTER switch to position 1.

781. Press Keys CL, 00014, 02000.

782. Verify that the RZ display is 0000 000 000 001 100.

783. Verify that the REG SEL display is 0000 010 000 000 000.

784. Press the CHANNEL button.

785. Press the EXECUTE button.

786. Verify that the LINC indicator is on.

787. Press Keys CL, 00054, 02000.

788. Verify that the RZ display is 0000 000 000 101 100.

789. Verify that the REG SEL display is 0000 010 000 000 000.

790. Press the EXECUTE button.

791. Set the CHANNEL T switches to the 201 position.

792. Set the INHIBIT INTERRUPT switch to the OFF position.

793. Press the MONITOR indicator switch to the on (illuminated) position.

794. Set the INCREMENTS INHIBIT switch to the OFF position.

795. Set the T12 COUNTER STOP switch to the OFF position.

796. Press the NEGATIVE indicator switch to the off position, and press the POSITIVE indicator switch to the on position.

797. Press the RESET button on the FREQUENCY COUNTER.

798. Press the PROCEED button.

799. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

800. Set the T12 COUNTER STOP switch to the ON position.

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801. Set the INCREMENTS INHIBIT switch to the ON position.

802. Set the INHIBIT INTERRUPT switch to the ON position.

803. Press the READ AGC indicator switch to the on (illuminated) position.

804. Press Keys CL, 0014.

805. Verify that the RZ display is 0000 000 000 001 100.

806. Press the CHANNEL button.

807. Press the EXECUTE button.

808. Verify that the OINC indicator is on.

809. Verify that BIT 11 of the REG SEL display is a "0". Stamp data sheet.

810. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

811. Press Keys CL, 0014, 02000.

812. Verify that the RZ display is 0000 000 000 001 100.

813. Verify that the REG SEL display is 0000 010 000 000 000.

814. Press the CHANNEL button.

815. Press the EXECUTE button.

816. Verify that the LINC indicator is on.

817. Press Keys CL, 00054, 75777.

818. Verify that the RZ display is 0000 000 000 101 100.

819. Verify that the REG SEL display is 0111 101 111 111 111.

820. Press the EXECUTE button.

821. Set the CHANNEL T switches to the 202 position.

822. Press the MONITOR indicator switch to the on (illuminated) position.

823. Set the AGC INPUT COUNTERS to position 1.

824. Press the NEGATIVE indicator switch to the on position (illuminated), and press the POSITIVE indicator switch to the off position (not illuminated).

825. Set the INCREMENTS INHIBIT switch to the OFF position.

826. Set the INHIBIT INTERRUPT switch to the OFF position.

827. Set the T12 COUNTER STOP switch to the OFF position.

828. Press the RESET button on the FREQUENCY COUNTER.

829. Press the PROCEED button.

830. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

831. Set the T12 COUNTER STOP switch to the ON position.

832. Set the INCREMENTS INHIBIT switch to the ON position.

833. Set the INHIBIT INTERRUPT switch to the ON position.

834. Press the READ AGC indicator switch to the on (illuminated) position.

835. Press Keys CL, 0014.

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836. Verify that the RZ display is 0000 000 000 001 100.

837. Press the CHANNEL button.

838. Press the EXECUTE button.

839. Verify that the OINC indicator is on.

840. Verify that BIT 11 of the REG SEL display is a "0". Stamp data sheet.

841. Set the CHANNEL T switches to position 101.

842. Set the FREQ + PHASE switch to the FRS 8 → T position.

CDU-X

843. Set the AGC INPUT COUNTERS switch to position 3.

844. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

845. Press Keys CL, 00014, 40000.

846. Verify that the RZ display is 0000 000 000 001 100.

847. Verify that the REG SEL display is 0000 100 000 000 000.

848. Press the CHANNEL button.

849. Press the EXECUTE button.

850. Verify that the LINC indicator is on.

851. Press Keys CL, 00050, 75777.

852. Verify that the RZ display is 0000 000 000 101 000.

853. Verify that the REG SEL display is 0111 101 111 111 111.

854. Press the EXECUTE button.

855. Set the CHANNEL S switches to the 202 position.

856. Press the MONITOR indicator switch to the on (illuminated) position.

857. Set the INCREMENTS INHIBIT switch to the OFF position.

858. Set the INHIBIT INTERRUPT switch to the OFF position.

859. Set the T12 COUNTER STOP switch to the OFF position.

860. Press the RESET button on the FREQUENCY COUNTER.

861. Press the PROCEED button.

862. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

863. Set the T12 COUNTER STOP switch to the ON position.

864. Set the INCREMENTS INHIBIT switch to the ON position.

865. Set the INHIBIT INTERRUPT switch to the ON position.

866. Press the READ AGC indicator switch to the on (illuminated) position.

867. Press Keys CL, 0014.

868. Verify that the RZ display is 0000 000 000 001 100.

869. Press the CHANNEL button.

870. Press the EXECUTE button.

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871. Verify that the OINC incidator is on.

872. Verify that BIT 15 of the REG SEL display is a "0". Stamp data sheet.

CDU-Y

873. Set the AGC INPUT COUNTERS switch to position 4.

874. Press the KEYBOARD LOAD incicator switch to the on (illuminated) position.

875. Press Keys CL, 00014, 20000.

876. Verify that the RZ display is 0000 000 000 001 100.

877. Verify that the REG SEL display is 0010 000 000 000 000.

878. Press the CHANNEL button.

879. Press the EXECUTE button.

880. Verify that the LINC indicator is on.

881. Press Keys CL, 00051, 75777.

882. Verify that the RZ display is 0000 000 000 101 001.

883. Verify that the REG SEL display is 0111 101 111 111 111.

884. Press the EXECUTE button.

885. Set the CHANNEL S switches to the 204 position.

886. Press the MONITOR indicator switch to the on (illuminated) position.

887. Set the INCREMENTS INHIBIT switch to the OFF position.

888. Set the INHIBIT INTERRUPT switch to the OFF position.

889. Set the T12 COUNTER STOP switch to the OFF position.

890. Press the RESET button on the FREQUENCY COUNTER.

891. Press the PROCEED button.

892. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

893. Set the T12 COUNTER STOP switch to the ON position.

894. Set the INCREMENTS INHIBIT switch to the ON position.

895. Set the INHIBIT INTERRUPT switch to the ON position.

896. Press the READ AGC indicator switch to the on (illuminated) position.

897. Press Keys CL, 0014.

898. Verify that the RZ display is 0000 000 000 001 100.

899. Press the CHANNEL button.

900. Press the EXECUTE button.

901. Verify that the OINC indicator is on.

902. Verify that BIT 14 of the REG SEL display is a "0". Stamp data sheet.

CDU-Z

903. Set the AGC INPUT COUNTERS switch to position 5.

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904. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

905. Press Keys CL, 0014, 10000.

906. Verify that the RZ display is 0000 000 000 001 100.

907. Verify that the REG SEL display is 0001 000 000 000 000.

908. Press the CHANNEL button.

909. Press the EXECUTE button.

910. Verify that the LINC indicator is on.

911. Press Keys CL, 00052, 75777.

912. Verify that the RZ display is 0000 000 000 101 010.

913. Verify that the REG SEL display is 0111 101 111 111 111.

914. Press the EXECUTE button.

915. Set the CHANNEL S switches to the 206 position.

916. Press the MONITOR indicator switch to the on (illuminated) position.

917. Set the INCREMENTS INHIBIT switch to the OFF position.

918. Set the INHIBIT INTERRUPT switch to the OFF position.

919. Set the T12 COUNTER STOP switch to the OFF position.

920. Press the RESET button on the FREQUENCY COUNTER.

921. Press the PROCEED button.

922. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

923. Set the T12 COUNTER STOP switch to the ON position.

924. Set the INCREMENTS INHIBIT switch to the ON position.

925. Set the INHIBIT INTERRUPT switch to the ON position.

926. Press the READ AGC indicator switch to the on (illuminated) position.

927. Press Keys CL, 0014.

928. Verify that the RZ display is 0000 000 000 001 100.

929. Press the CHANNEL button.

930. Press the EXECUTE button.

931. Verify that the OINC indicator is on.

932. Verify that BIT 13 of the REG SEL display is a "0". Stamp data sheet.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 5

JDC
NO. 05788
REV. ______
INITIAL TDRR 35464

JOB CDU COUNTERS TEST

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ ______ CAL DATE
NAME ______ SER. NO. ______ ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
20.	RG Indication	0011 111 111 111 111	
22.	RG Indication	1100 000 000 000 000	
24.	RG Indication	1100 000 000 000 001	
28.	RG Indication	1100 000 000 000 000	
49.	RG Indication	0011 111 111 111 110	
55.	RG Indication	0011 111 111 111 110	
63.	RG Indication	0011 111 111 111 100	
69.	RG Indication	0011 111 111 111 111	
91.	RG Indication	0011 111 111 111 111	
93.	RG Indication	1100 000 000 000 000	
95.	RG Indication	1100 000 000 000 001	
99.	RG Indication	1100 000 000 000 000	
120.	RG Indication	0011 111 111 111 110	
126.	RG Indication	0011 111 111 111 110	
134.	RG Indication	0011 111 111 111 100	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 5

JDC
NO. 05788
REV. ______

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
140.	RG Indication	0011 111 111 111 111	
162.	RG Indication	0011 111 111 111 111	
164.	RG Indication	1100 000 000 000 000	
166.	RG Indication	1100 000 000 000 001	
170.	RG Indication	1100 000 000 000 000	
191.	RG Indication	0011 111 111 111 110	
197.	RG Indication	0011 111 111 111 110	
205.	RG Indication	0011 111 111 111 100	
211.	RG Indication	0011 111 111 111 111	
233.	RG Indication	0011 111 111 111 111	
235.	RG Indication	1100 000 000 000 000	
237.	RG Indication	1100 000 000 000 001	
241.	RG Indication	1100 000 000 000 000	
262.	RG Indication	0011 111 111 111 110	
268.	RG Indication	0011 111 111 111 110	
276.	RG Indication	0011 111 111 111 100	
282.	RG Indication	0011 111 111 111 111	
304.	RG Indication	0011 111 111 111 111	
306.	RG Indication	1100 000 000 000 000	
308.	RG Indication	1100 000 000 000 001	
312.	RG Indication	1100 000 000 000 000	
333.	RG Indication	0011 111 111 111 110	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 5

JDC
NO. 05788
REV. ______

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
339.	RG Indication	0011 111 111 111 110	
347.	RG Indication	0011 111 111 111 100	
353.	RG Indication	0011 111 111 111 111	
373.	REG SEL Indication	1111 111 111 111 111	
385.	REG SEL Indication	1101 010 101 010 101	
397.	REG SEL Indication	0000 000 000 000 000	
416.	FREQUENCY COUNTER Display	1024	
426.	REG SEL Indication	BIT 16 is a "0"	
445.	FREQUENCY COUNTER Display	1024	
455.	REG SEL Indication	BIT 16 is a "0"	
467.	REG SEL Indication	1111 111 111 111 111	
479.	REG SEL Indication	1101 010 101 010 101	
491.	REG SEL Indication	0000 000 000 000 000	
510.	FREQUENCY COUNTER Display	1024	
520.	REG SEL Indication	BIT 14 is a "0"	
539.	FREQUENCY COUNTER Display	1024	
549.	REG SEL Indication	BIT 14 is a "0"	
561.	REG SEL Indication	1111 111 111 111 111	
573.	REG SEL Indication	1001 010 101 010 101	
585.	REG SEL Indication	0000 000 000 000 000	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 5

JDC
NO. 05788
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JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
604.	FREQUENCY COUNTER Display	1024	
614.	REG SEL Indication	BIT 13 is a "0"	
633.	FREQUENCY COUNTER Display	1024	
643.	REG SEL Indication	BIT 13 is a "0"	
657.	REG SEL Indication	1111 111 111 111 111	
669.	REG SEL Indication	1001 010 101 010 101	
681.	REG SEL Indication	0000 000 000 000 000	
702.	FREQUENCY COUNTER Display	1024	
712.	REG SEL Indication	BIT 12 is a "0"	
732.	FREQUENCY COUNTER Display	1024	
742.	REG SEL Indication	BIT 12 is a "0"	
754.	REG SEL Indication	1111 111 111 111 111	
766.	REG SEL Indication	1001 010 101 010 101	
778.	REG SEL Indication	0000 000 000 000 000	
799.	FREQUENCY COUNTER Display	1024	
809.	REG SEL Indication	BIT 11 is a "0"	
830.	FREQUENCY COUNTER Display	1024	
840.	REG SEL Indication	BIT 11 is a "0"	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 5

JDC
NO. 05788
REV. ____

JOB CDU COUNTERS TEST

Step	Parameter	Specification	Results
862.	FREQUENCY COUNTER Display	1024	____
872.	REG SEL Indication	BIT 15 is a "0"	____
892.	FREQUENCY COUNTER Display	1024	____
902.	REG SEL Indication	BIT 14 is a "0"	____
922.	FREQUENCY COUNTER Display	1024	____
932.	REG SEL Indication	BIT 13 is a "0"	____

DATE ____

JOB PIPA COUNTERS TEST

JDC 05789 REV. ____ PAGE 1 OF 8
INITIAL TDRR 35464 D.S. PGS 2

SUBSYSTEM Computer

ASSY. Block II C-Computer

DESCRIPTION

Tests the operation of the PIPA counters under normal and marginal input conditions.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA

REFERENCES JDC's 05413, 05414, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the XY Interface panel of the CTS.

PIPA X TEST

3. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

4. Press Keys CL, 00014, 00040.

5. Verify that the RZ display is 0000 000 000 001 100.

6. Verify that the REG SEL display is 0000 000 000 100 000.

7. Press the CHANNEL button.

8. Press the EXECUTE button.

9. Verify that the LINC indicator is on.

10. Verify that the RG display is 0000 000 000 100 000.

11. Press Keys CL, 00037, 37774.

12. Verify that the RZ display is 0000 000 000 011 111.

13. Verify that the REG SEL display is 0011 111 111 111 100.

VERIFICATION, WITH SIDL REQUIRED BEFORE USE DATE ____

JOB PIPA COUNTERS TEST

JDC 05789 REV PAGE 2 OF 8

SUBSYSTEM Computer

ASSY Block II C-Computer

14. Press the EXECUTE button.

15. Verify that the RG display is 0011 111 111 111 100.

16. Set the AGREEMENT A switches to XXXX 0037.

17. Set the Agreement A switch to the SAMPLE position.

18. Press the MONITOR indicator switch to the on (illuminated) position.

19. Set the T12 COUNTER STOP switch to the OFF position.

20. Set the INCREMENTS INHIBIT switch to the OFF position.

21. Set the AGC INPUT COUNTERS switch to position 20.

22. Press the POSITIVE indicator switch to the on (illuminated) position.

23. Press the B II PIPA indicator switch to the on (illuminated) position.

24. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

25. Press the PROCEED button.

26. Press the SINGLE PULSE button 3 to 7 times until the RG display is 0011 111 111 111 111.

27. Press the SINGLE PULSE button.

28. Verify that the RG display is 0100 000 000 000 000. Stamp data sheet.

29. Press the SINGLE PULSE button.

30. Verify that the RG display is 0000 000 000 000 001. Stamp data sheet.

31. Press the POSITIVE indicator switch to the off (extinguished) position.

32. Press the NEGATIVE indicator switch to the on (illuminated) position.

33. Press the SINGLE PULSE button three times.

34. Verify that the RG display is 0000 000 000 000 001. Stamp data sheet.

35. Press the SINGLE PULSE button.

36. Verify that the RG display is 1111 111 111 111 111.

37. Press the SINGLE PULSE button.

38. Verify that the RG display is 1111 111 111 111 110. Stamp data sheet.

39. Press the NEGATIVE indicator switch to the off (extinguished) position.

40. Press the POSITIVE indicator switch to the on (illuminated) position.

41. Press the SINGLE PULSE button three times.

42. Verify that the RG display is 1111 111 111 111 110. Stamp data sheet.

43. Press the SINGLE PULSE button.

44. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

45. Set the T12 COUNTER STOP switch to the ON position.

Input Margins Check

46. Set the Y MARGINS switch to the V2 (High Zero) position.

DATE ____

JOB PIPA COUNTERS TEST

JDC 05789 REV PAGE 3 OF 8

SUBSYSTEM Computer

ASSY Block II C-Computer

47. Set the T12 COUNTER STOP switch to the OFF position.

48. Press the PROCEED button.

49. Press the SINGLE PULSE button 7 times.

50. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

51. Press the POSITIVE indicator switch to the off (extinguished) position.

52. Press the NEGATIVE indicator switch to the on (illuminated) position.

53. Press the SINGLE PULSE button 7 times.

54. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

55. Set the T12 COUNTER STOP switch to the ON position.

56. Set the Y MARGINS switch to the V3 (Low One) position.

57. Set the T12 COUNTER STOP switch to the OFF position.

58. Press the PROCEED button.

59. Press the SINGLE PULSE button 3 to 7 times until the RG display is 1111 111 111 111 110.

60. Press the SINGLE PULSE button.

61. Verify that the RG display is 1111 111 111 111 101. Stamp data sheet.

62. Press the NEGATIVE indicator switch to the off (extinguished) position.

63. Press the POSITIVE indicator switch to the on (illuminated) position.

64. Press the SINGLE PULSE button three times.

65. Verify that the RG display is 1111 111 111 111 101.

66. Press the SINGLE PULSE button.

67. Verify that the RG display is 1111 111 111 111 110.

68. Press the SINGLE PULSE button.

69. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

70. Set the T12 COUNTER STOP switch to the ON position.

71. Set the INCREMENTS INHIBIT switch to the ON position.

72. Set the Agreement A switch to the OFF position.

73. Set the Y MARGINS switch to the NORM position.

PIPA Y TEST

74. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

75. Press Keys CL, 00014, 00040.

76. Verify that the RZ display is 0000 000 000 001 100.

77. Verify that the REG SEL display is 0000 000 000 100 000.

DATE ____

JOB PIPA COUNTERS TEST

JDC 05789 REV PAGE 4 OF 8

SUBSYSTEM Computer

ASSY Block II C-Computer

78. Press the CHANNEL button.

79. Press the EXECUTE button.

80. Verify that the LINC indicator is on.

81. Verify that the RG display is 0000 000 000 100 000.

82. Press Keys CL, 00040, 37774.

83. Verify that the RZ display is 0000 000 000 100 000.

84. Verify that the REG SEL display is 0011 111 111 111 100.

85. Press the EXECUTE button.

86. Verify that the RG display is 0011 111 111 111 100.

87. Set the AGREEMENT A switches to XXXX 0040.

88. Set the Agreement A switch to the SAMPLE position.

89. Press the MONITOR indicator switch to the on (illuminated) position.

90. Set the T12 COUNTER STOP switch to the OFF position.

91. Set the INCREMENTS INHIBIT switch to the OFF position.

92. Set the AGC INPUT COUNTERS switch to position 19.

93. Press the POSITIVE indicator switch to the on (illuminated) position.

94. Press the B II PIPA indicator switch to the on (illuminated) position.

95. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

96. Press the PROCEED button.

97. Press the SINGLE PULSE button 3 to 7 times until the RG display is 0011 111 111 111 111.

98. Press the SINGLE PULSE button.

99. Verify that the RG display is 0100 000 000 000 000. Stamp data sheet.

100. Press the SINGLE PULSE button.

101. Verify that the RG display is 0000 000 000 000 001. Stamp data sheet.

102. Press the POSITIVE indicator switch to the off (extinguished) position.

103. Press the NEGATIVE indicator switch to the on (illuminated) position.

104. Press the SINGLE PULSE button three times.

105. Verify that the RG display is 0000 000 000 000 001. Stamp data sheet.

106. Press the SINGLE PULSE button.

107. Verify that the RG display is 1111 111 111 111 111.

108. Press the SINGLE PULSE button.

109. Verify that the RG display is 1111 111 111 111 110. Stamp data sheet.

110. Press the NEGATIVE indicator switch to the off (extinguished) position.

111. Press the POSITIVE indicator switch to the on (illuminated) position.

DATE ____

JOB PIPA COUNTERS TEST **JDC** 05789 **REV** **PAGE** 5 **OF** 8

SUBSYSTEM Computer **ASSY** Block II C-Computer

112. Press the SINGLE PULSE button three times.

113. Verify that the RG display is 1111 111 111 111 110. Stamp data sheet.

114. Press the SINGLE PULSE button.

115. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

116. Set the T12 COUNTER STOP switch to the ON position.

Input Margins Check

117. Set the Y MARGINS switch to the V2 (High Zero) position.

118. Set the T12 COUNTER STOP switch to the OFF position.

119. Press the PROCEED button.

120. Press the SINGLE PULSE button 7 times.

121. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

122. Press the POSITIVE indicator switch to the off (extinguished) position.

123. Press the NEGATIVE indicator switch to the on (illuminated) position.

124. Press the SINGLE PULSE button 7 times.

125. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

126. Set the T12 COUNTER STOP switch to the ON position.

127. Set the Y MARGINS switch to the V3 (Low One) position.

128. Set the T12 COUNTER STOP switch to the OFF position.

129. Press the PROCEED button.

130. Press the SINGLE PULSE button 3 to 7 times until the RG display is 1111 111 111 111 110.

131. Press the SINGLE PULSE button.

132. Verify that the RG display is 1111 111 111 111 101. Stamp data sheet.

133. Press the NEGATIVE indicator switch to the off (extinguished) position.

134. Press the POSITIVE indicator switch to the on (illuminated) position.

135. Press the SINGLE PULSE button three times.

136. Verify that the RG display is 1111 111 111 111 101.

137. Press the SINGLE PULSE button.

138. Verify that the RG display is 1111 111 111 111 110.

139. Press the SINGLE PULSE button.

140. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

141. Set the T12 COUNTER STOP switch to the ON position.

142. Set the INCREMENTS INHIBIT switch to the ON position.

143. Set the Agreement A switch to the OFF position.

144. Set the Y MARGINS switch to the NORM position.

DATE ________

JOB PIPA COUNTERS TEST **JDC** 05789 **REV** . **PAGE** 6 **OF** 8

SUBSYSTEM Computer **ASSY** Block II C-Computer

PIPA Z TEST

145. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

146. Press Keys CL, 00014, 00040.

147. Verify that the RZ display is 0000 000 000 001 100.

148. Verify that the REG SEL display is 0000 000 000 100 000.

149. Press the CHANNEL button.

150. Press the EXECUTE button.

151. Verify that the LINC indicator is on.

152. Verify that the RG display is 0000 000 000 100 000.

153. Press Keys CL, 00041, 37774.

154. Verify that the RZ display is 0000 000 000 100 001.

155. Verify that the REG SEL display is 0011 111 111 111 100.

156. Press the EXECUTE button.

157. Verify that the RG display is 0011 111 111 111 100.

158. Set the AGREEMENT A switches to XXXX 0041.

159. Set the Agreement A switch to the SAMPLE position.

160. Press the MONITOR indicator switch to the on (illuminated) position.

161. Set the T12 COUNTER STOP switch to the OFF position.

162. Set the INCREMENTS INHIBIT switch to the OFF position.

163. Set the AGC INPUT COUNTERS switch to position 18.

164. Press the POSITIVE indicator switch to the on (illuminated) position.

165. Press the B II PIPA indicator switch to the on (illuminated) position.

166. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

167. Press the PROCEED button.

168. Press the SINGLE PULSE button 3 to 7 times until the RG display is 0011 111 111 111 111.

169. Press the SINGLE PULSE button.

170. Verify that the RG display is 0100 000 000 000 000. Stamp data sheet.

171. Press the SINGLE PULSE button.

172. Verify that the RG display is 0000 000 000 000 001. Stamp data sheet.

173. Press the POSITIVE indicator switch to the off (extinguished) position.

174. Press the NEGATIVE indicator switch to the on (illuminated) position.

175. Press the SINGLE PULSE button three times.

176. Verify that the RG display is 0000 000 000 000 001. Stamp data sheet.

177. Press the SINGLE PULSE button.

178. Verify that the RG display is 1111 111 111 111 111.

DATE ________

JOB PIPA COUNTERS TEST **JDC** 05789 **REV** **PAGE** 7 **OF** 8

SUBSYSTEM Computer **ASSY** Block II C-Computer

179. Press the SINGLE PULSE button.

180. Verify that the RG display is 1111 111 111 111 110. Stamp data sheet.

181. Press the NEGATIVE indicator switch to the off (extinguished) position.

182. Press the POSITIVE indicator switch to the on (illuminated) position.

183. Press the SINGLE PULSE button three times.

184. Verify that the RG display is 1111 111 111 111 110. Stamp data sheet.

185. Press the SINGLE PULSE button.

186. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

187. Set the T12 COUNTER STOP switch to the ON position.

Input Margins Check

188. Set the Y MARGINS switch to the V2 (High Zero) position.

189. Set the T12 COUNTER STOP switch to the OFF position.

190. Press the PROCEED button.

191. Press the SINGLE PULSE button 7 times.

192. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

193. Press the POSITIVE indicator switch to the off (extinguished) position.

194. Press the NEGATIVE indicator switch to the on (illuminated) position.

195. Press the SINGLE PULSE button 7 times.

196. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

197. Set the T12 COUNTER STOP switch to the ON position.

198. Set the Y MARGINS switch to the V3 (Low One) position.

199. Set the T12 COUNTER STOP switch to the OFF position.

200. Press the PROCEED button.

201. Press the SINGLE PULSE button 3 to 7 times until the RG display is 1111 111 111 111 110.

202. Press the SINGLE PULSE button.

203. Verify that the RG display is 1111 111 111 111 101. Stamp data sheet.

204. Press the NEGATIVE indicator switch to the off (extinguished) position.

205. Press the POSITIVE indicator switch to the on (illuminated) position.

206. Press the SINGLE PULSE button three times.

207. Verify that the RG display is 1111 111 111 111 101.

208. Press the SINGLE PULSE button.

209. Verify that the RG display is 1111 111 111 111 110.

210. Press the SINGLE PULSE button.

211. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

DATE ________

JOB PIPA COUNTERS TEST **JDC** 05789 **REV** **PAGE** 8 **OF** 8

SUBSYSTEM Computer **ASSY** Block II C-Computer

212. Set the T12 COUNTER STOP switch to the ON position.

213. Set the INCREMENTS INHIBIT switch to the ON position.

214. Set the Agreement A switch to the OFF position.

215. Set the Y MARGINS switch to the NORM position.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

NO. 05789 JDC
REV. ______
INITIAL TDRR 35464

JOB PIPA COUNTERS TEST

ASSEMBLY UNDER TEST

TITLE __________
SER. NO. ______ DWG ______ REV. ____

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME __________ SER. NO. ______ ______ CAL DATE
NAME __________ SER. NO. ______ ______ CAL DATE

CONDUCTED BY __________ NAME/AFFILIATION APPROVED BY __________ NAME/AFFILIATION

Step	Parameter	Specification	Results
28.	RG Indication	0100 000 000 000 000	______
30.	RG Indication	0000 000 000 000 001	______
34.	RG Indication	0000 000 000 000 001	______
38.	RG Indication	1111 111 111 111 110	______
42.	RG Indication	1111 111 111 111 110	______
44.	RG Indication	1111 111 111 111 111	______
50.	RG Indication	1111 111 111 111 111	______
54.	RG Indication	1111 111 111 111 111	______
61.	RG Indication	1111 111 111 111 101	______
69.	RG Indication	1111 111 111 111 111	______
99.	RG Indication	0100 000 000 000 000	______
101.	RG Indication	0000 000 000 000 001	______
105.	RG Indication	0000 000 000 000 001	______
109.	RG Indication	1111 111 111 111 110	______
113.	RG Indication	1111 111 111 111 110	______

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 05789
REV. ______

JOB PIPA COUNTERS TEST

Step	Parameter	Specification	Results
115.	RG Indication	1111 111 111 111 111	______
121.	RG Indication	1111 111 111 111 111	______
125.	RG Indication	1111 111 111 111 111	______
132.	RG Indication	1111 111 111 111 101	______
140.	RG Indication	1111 111 111 111 111	______
170.	RG Indication	0100 000 000 000 000	______
172.	RG Indication	0000 000 000 000 001	______
176.	RG Indication	0000 000 000 000 001	______
180.	RG Indication	1111 111 111 111 110	______
184.	RG Indication	1111 111 111 111 110	______
186.	RG Indication	1111 111 111 111 111	______
192.	RG Indication	1111 111 111 111 111	______
196.	RG Indication	1111 111 111 111 111	______
203.	RG Indication	1111 111 111 111 101	______
211.	RG Indication	1111 111 111 111 111	______

DATE ______

JOB GYRO COUNTERS TEST

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INITIAL TDRR 35464 D.S. PGS 2

SUBSYSTEM Computer

ASSY. Block II C-Computer

DESCRIPTION

Tests the operation of the Gyro Counters under normal and marginal input conditions.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC's 05402, 05413, 05414, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor Panel, the Logic Drawer No. 2 panel and the XY Interface panel of the CTS.

BMAG X TEST

3. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

4. Press Keys CL, 00013, 00200.

5. Verify that the RZ display is 0000 000 000 001 011.

6. Verify that the REG SEL display is 0000 000 010 000 000.

7. Press the CHANNEL button.

8. Press the EXECUTE button.

9. Verify that the RG display is 0000 000 010 000 000.

10. Verify that the LINC indicator is on.

11. Press Keys CL, 00042, 37776.

12. Verify that the RZ display is 0000 000 000 100 010.

VERIFICATION WITH SIOL REQUIRED BEFORE USE DATE ________

SUBSYSTEM Computer | ASSY Block II C-Computer

13. Verify that the REG SEL display is 0011 111 111 111 110.

14. Press the EXECUTE button.

15. Verify that the RG display is 0011 111 111 111 110.

16. Verify that the LINC indicator is on.

17. Set the AGREEMENT A switches to XXXX 0042.

18. Press the MONITOR indicator switch to the on (illuminated) position.

19. Set the T12 COUNTER STOP switch to the OFF position.

20. Set the INCREMENTS INHIBIT switch to the OFF position.

21. Set the AGC INPUT COUNTERS switch to position 6.

22. Press the POSITIVE indicator switch to the on (illuminated) position.

23. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

24. Set the Agreement A switch to SAMPLE.

25. Press the PROCEED button.

26. Press the SINGLE PULSE button.

27. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

28. Press the SINGLE PULSE button.

29. Verify that the RG display is 0100 000 000 000 000. Stamp data sheet.

30. Press the SINGLE PULSE button.

31. Verify that the RG display is 0000 000 000 000 001. Stamp data sheet.

32. Press the POSITIVE indicator switch to the off (extinguished) position.

33. Press the NEGATIVE indicator switch to the on (illuminated) position.

34. Press the SINGLE PULSE button.

35. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

36. Press the SINGLE PULSE button twice.

37. Verify that the RG display is 1111 111 111 111 101. Stamp data sheet.

38. Set the T12 COUNTER STOP switch to the ON position.

39. Set the INCREMENTS INHIBIT switch to the ON position and the Agreement A switch to the OFF position.

Input Margins

40. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

41. Press Keys CL, 00042, 37776.

42. Verify that the RZ display is 0000 000 000 100 010.

43. Verify that the REG SEL display is 0011 111 111 111 110.

44. Press the EXECUTE button.

45. Verify that the RG display is 0011 111 111 111 110.

46. Verify that the LINC indicator is on.

DATE ________

SUBSYSTEM Computer | ASSY Block II C-Computer

47. Set the Y MARGINS switch to the V2 (High Zero) position.

48. Press the MONITOR indicator switch to the on (illuminated) position.

49. Press the NEGATIVE indicator switch to the off (extinguished) position.

50. Press the POSITIVE indicator switch to the on (illuminated) position.

51. Set the T12 COUNTER STOP switch to the OFF position.

52. Set the INCREMENTS INHIBIT switch to the OFF position and the Agreement A switch to SAMPLE.

53. Press the PROCEED button.

54. Press the SINGLE PULSE button.

55. Verify that the RG display is 0011 111 111 111 110.

56. Press the SINGLE PULSE button.

57. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

58. Press the POSITIVE indicator switch to the off (extinguished) position.

59. Press the NEGATIVE indicator switch to the on (illuminated) position.

60. Press the SINGLE PULSE button.

61. Verify that the RG display is 0011 111 111 111 110.

62. Press the SINGLE PULSE button twice.

63. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

64. Set the T12 COUNTER STOP switch to the ON position.

65. Set the Y MARGINS switch to the V3 (Low One) position.

66. Set the T12 COUNTER STOP switch to the OFF position.

67. Press the PROCEED button.

68. Press the SINGLE PULSE button.

69. Verify that the RG display is 0011 111 111 111 101.

70. Press the SINGLE PULSE button.

71. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

72. Press the NEGATIVE indicator switch to the off (extinguished) position.

73. Press the POSITIVE indicator switch to the on (illuminated) position.

74. Press the SINGLE PULSE button.

75. Verify that the RG display is 0011 111 111 111 101.

76. Press the SINGLE PULSE button twice.

77. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

78. Set the T12 COUNTER STOP switch to the ON position.

79. Set the INCREMENTS INHIBIT switch to the ON position.

80. Set the Agreement A switch to the OFF position.

DATE ________

SUBSYSTEM Computer | ASSY Block II C-Computer

81. Set the Y MARGINS switch to the NORM position.

BMAG Y TEST

82. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

83. Press Keys CL, 00013, 00200.

84. Verify that the RZ display is 0000 000 000 001 011.

85. Verify that the REG SEL display is 0000 000 010 000 000.

86. Press the CHANNEL button.

87. Press the EXECUTE button.

88. Verify that the RG display is 0000 000 010 000 000.

89. Verify that the LINC indicator is on.

90. Press Keys CL, 00043, 37776.

91. Verify that the RZ display is 0000 000 000 100 011.

92. Verify that the REG SEL display is 0011 111 111 111 110.

93. Press the EXECUTE button.

94. Verify that the RG display is 0011 111 111 111 110.

95. Verify that the LINC indicator is on.

96. Set the AGREEMENT A switches to XXXX 0043.

97. Press the MONITOR indicator switch to the on (illuminated) position.

98. Set the T12 COUNTER STOP switch to the OFF position.

99. Set the INCREMENTS INHIBIT switch to the OFF position.

100. Set the AGC INPUT COUNTERS switch to position 7.

101. Press the POSITIVE indicator switch to the on (illuminated) position.

102. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

103. Set the Agreement A switch to SAMPLE.

104. Press the PROCEED button.

105. Press the SINGLE PULSE button.

106. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

107. Press the SINGLE PULSE button.

108. Verify that the RG display is 0100 000 000 000 000. Stamp data sheet.

109. Press the SINGLE PULSE button.

110. Verify that the RG display is 0000 000 000 000 001. Stamp data sheet.

111. Press the POSITIVE indicator switch to the off (extinguished) position.

112. Press the NEGATIVE indicator switch to the on (illuminated) position.

113. Press the SINGLE PULSE button.

114. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

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115. Press the SINGLE PULSE button twice.

116. Verify that the RG display is 1111 111 111 111 101. Stamp data sheet.

117. Set the T12 COUNTER STOP switch to the ON position.

118. Set the INCREMENTS INHIBIT switch to the ON position and the Agreement A switch to the OFF position.

Input Margins

119. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

120. Press Keys CL, 00043, 37776.

121. Verify that the RZ display is 0000 000 000 100 011.

122. Verify that the REG SEL display is 0011 111 111 111 110.

123. Press the EXECUTE button.

124. Verify that the RG display is 0011 111 111 111 110.

125. Verify that the LINC indicator is on.

126. Set the Y MARGINS switch to the V2 (High Zero) position.

127. Press the MONITOR indicator switch to the on (illuminated) position.

128. Press the NEGATIVE indicator switch to the off (extinguished) position.

129. Press the POSITIVE indicator switch to the on (illuminated) position.

130. Set the T12 COUNTER STOP switch to the OFF position.

131. Set the INCREMENTS INHIBIT switch to the OFF position and the Agreement A switch to SAMPLE.

132. Press the PROCEED button.

133. Press the SINGLE PULSE button.

134. Verify that the RG display is 0011 111 111 111 110.

135. Press the SINGLE PULSE button.

136. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

137. Press the POSITIVE indicator switch to the off (extinguished) position.

138. Press the NEGATIVE indicator switch to the on (illuminated) position.

139. Press the SINGLE PULSE button.

140. Verify that the RG display is 0011 111 111 111 110.

141. Press the SINGLE PULSE button twice.

142. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

143. Set the T12 COUNTER STOP switch to the ON position.

144. Set the Y MARGINS switch to the V3 (Low One) position.

145. Set the T12 COUNTER STOP switch to the OFF position.

146. Press the PROCEED button.

147. Press the SINGLE PULSE button.

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148. Verify that the RG display is 0011 111 111 111 101.

149. Press the SINGLE PULSE button.

150. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

151. Press the NEGATIVE indicator switch to the off (extinguished) position.

152. Press the POSITIVE indicator switch to the on (illuminated) position.

153. Press the SINGLE PULSE button.

154. Verify that the RG display is 0011 111 111 111 101.

155. Press the SINGLE PULSE button twice.

156. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

157. Set the T12 COUNTER STOP switch to the ON position.

158. Set the INCREMENTS INHIBIT switch to the ON position.

159. Set the Agreement A switch to the OFF position.

160. Set the Y MARGINS switch to the NORM position.

BMAG Z TEST

161. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

162. Press Keys CL, 00013, 00200.

163. Verify that the RZ display is 0000 000 000 001 011.

164. Verify that the REG SEL display is 0000 000 010 000 000.

165. Press the CHANNEL button.

166. Press the EXECUTE button.

167. Verify that the RG display is 0000 000 010 000 000.

168. Verify that the LINC indicator is on.

169. Press Keys CL, 00044, 37776.

170. Verify that the RZ display is 0000 000 000 100 100.

171. Verify that the REG SEL display is 0011 111 111 111 110.

172. Press the EXECUTE button.

173. Verify that the RG display is 0011 111 111 111 110.

174. Verify that the LINC indicator is on.

175. Set the AGREEMENT A switches to XXXX 0044.

176. Press the MONITOR indicator switch to the on (illuminated) position.

177. Set the T12 COUNTER STOP switch to the OFF position.

178. Set the INCREMENTS INHIBIT switch to the OFF position.

179. Set the AGC INPUT COUNTERS switch to position 8.

180. Press the POSITIVE indicator switch to the on (illuminated) position.

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181. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

182. Set the Agreement A switch to SAMPLE.

183. Press the PROCEED button.

184. Press the SINGLE PULSE button.

185. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

186. Press the SINGLE PULSE button.

187. Verify that the RG display is 0100 000 000 000 000. Stamp data sheet.

188. Press the SINGLE PULSE button.

189. Verify that the RG display is 0000 000 000 000 001. Stamp data sheet.

190. Press the POSITIVE indicator switch to the off (extinguished) position.

191. Press the NEGATIVE indicator switch to the on (illuminated) position.

192. Press the SINGLE PULSE button.

193. Verify that the RG display is 1111 111 111 111 111. Stamp data sheet.

194. Press the SINGLE PULSE button twice.

195. Verify that the RG display is 1111 111 111 111 101. Stamp data sheet.

196. Set the T12 COUNTER STOP switch to the ON position.

197. Set the INCREMENTS INHIBIT switch to the ON position and the Agreement A switch to the OFF position.

Input Margins

198. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

199. Press Keys CL, 00044, 37776.

200. Verify that the RZ display is 0000 000 000 100 100.

201. Verify that the REG SEL display is 0011 111 111 111 110.

202. Press the EXECUTE button.

203. Verify that the RG display is 0011 111 111 111 110.

204. Verify that the LINC indicator is on.

205. Set the Y MARGINS switch to the V2 (High Zero) position.

206. Press the MONITOR indicator switch to the on (illuminated) position.

207. Press the NEGATIVE indicator switch to the off (extinguished) position.

208. Press the POSITIVE indicator switch to the on (illuminated) position.

209. Set the T12 COUNTER STOP switch to the OFF position.

210. Set the INCREMENTS INHIBIT switch to the OFF position and the Agreement A switch to SAMPLE.

211. Press the PROCEED button.

212. Press the SINGLE PULSE button.

213. Verify that the RG display is 0011 111 111 111 110.

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214. Press the SINGLE PULSE button.

215. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

216. Press the POSITIVE indicator switch to the off (extinguished) position.

217. Press the NEGATIVE indicator switch to the on (illuminated) position.

218. Press the SINGLE PULSE button.

219. Verify that the RG display is 0011 111 111 111 110.

220. Press the SINGLE PULSE button twice.

221. Verify that the RG display is 0011 111 111 111 110. Stamp data sheet.

222. Set the T12 COUNTER STOP switch to the ON position.

223. Set the Y MARGINS switch to the V3 (Low One) position.

224. Set the T12 COUNTER STOP switch to the OFF position.

225. Press the PROCEED button.

226. Press the SINGLE PULSE button.

227. Verify that the RG display is 0011 111 111 111 101.

228. Press the SINGLE PULSE button.

229. Verify that the RG display is 0011 111 111 111 100. Stamp data sheet.

230. Press the NEGATIVE indicator switch to the off (extinguished) position.

231. Press the POSITIVE indicator switch to the on (illuminated) position.

232. Press the SINGLE PULSE button.

233. Verify that the RG display is 0011 111 111 111 101.

234. Press the SINGLE PULSE button twice.

235. Verify that the RG display is 0011 111 111 111 111. Stamp data sheet.

236. Set the T12 COUNTER STOP switch to the ON position.

237. Set the INCREMENTS INHIBIT switch to the ON position.

238. Set the Agreement A switch to the OFF position.

239. Set the Y MARGINS switch to the NORM position.

GYRO (X, Y, and Z) TEST

240. Verify that the STRT1/STRT2 switch on the Buffer Circuit Assembly is in the OFF position.

241. Press the LOAD CHAN T 510 OHMS indicator switch to the on (illuminated) position.

242. Set the FREQ + PHASE switch to the FRT T → 8 position.

243. Prepare the CTS FREQUENCY COUNTER for operation as specified on step 1 of JDC 05402.

> NOTE: During this test the FREQUENCY COUNTER is to be operated as described under PROCEDURE in JDC 05402.

DATE ________

244. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

245. Press Keys CL, 00047, 77777.

246. Verify that the RZ display is 0000 000 000 100 111.

247. Verify that the REG SEL display is 0111 111 111 111 111.

248. Press the EXECUTE button.

249. Verify that the LINC indicator is on.

250. Press the READ AGC indicator switch to the on (illuminated) position.

251. Press Keys CL, 0047.

252. Verify that the RZ display is 0000 000 000 100 111.

253. Press the EXECUTE button.

254. Verify that the OINC indicator is on.

255. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

256. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

257. Press Keys CL, 00047, 52525.

258. Verify that the RZ display is 0000 000 000 100 111.

259. Verify that the REG SEL display is 0101 010 101 010 101.

260. Press the EXECUTE button.

261. Verify that the LINC indicator is on.

262. Press the READ AGC indicator switch to the on (illuminated) position.

263. Press Keys CL, 0047.

264. Verify that the RZ display is 0000 000 000 100 111.

265. Press the EXECUTE button.

266. Verify that the OINC indicator is on.

267. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

268. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

269. Press Keys CL, 00047, 00000.

270. Verify that the RZ display is 0000 000 000 100 111.

271. Verify that the REG SEL display is 0000 000 000 000 000.

272. Press the EXECUTE button.

273. Verify that the LINC indicator is on.

274. Press the READ AGC indicator switch to the on (illuminated) position.

275. Press Keys CL, 0047.

276. Verify that the RZ display is 0000 000 000 100 111.

277. Press the EXECUTE button.

278. Verify that the OINC indicator is on.

279. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

280. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

281. Press Keys CL, 00014, 01000.

DATE ____________

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282. Verify that the RZ display is 0000 000 000 001 100.

283. Verify that the REG SEL display is 0000 001 000 000 000.

284. Press the CHANNEL button.

285. Press the EXECUTE button.

286. Verify that the LINC indicator is on.

287. Press Keys CL, 00047, 02000.

288. Verify that the RZ display is 0000 000 000 100 111.

289. Verify that the REG SEL display is 0000 010 000 000 000.

290. Press the EXECUTE button.

291. Verify that the LINC indicator is on.

292. Set the CHANNEL T switches to the 212 position.

293. Press the MONITOR indicator switch to the on (illuminated) position.

294. Set the INHIBIT INTERRUPT switch to the OFF position.

295. Set the INCREMENTS INHIBIT switch to the OFF position.

296. Set the T12 COUNTER STOP switch to the OFF position.

297. Press the RESET button on the FREQUENCY COUNTER.

298. Press the PROCEED button.

299. Verify that the FREQUENCY COUNTER display is 1024. Stamp data sheet.

300. Set the T12 COUNTER STOP switch to the ON position.

301. Set the INCREMENTS INHIBIT switch to the ON position.

302. Set the INHIBIT INTERRUPT switch to the ON position.

303. Press the READ AGC indicator switch to the on (illuminated) position.

304. Press Keys CL, 0014.

305. Verify that the RZ display is 0000 000 000 001 100.

306. Press the CHANNEL button.

307. Press the EXECUTE button.

308. Verify that the OINC indicator is on.

309. Verify that BIT 10 of the REG SEL display is a "0". Stamp data sheet.

DATE ____________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

JDC NO. 05790
REV. ______
INITIAL TDRR 35464

JOB GYRO COUNTERS TEST

ASSEMBLY UNDER TEST

TITLE ____________

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________ SER. NO. ______ CAL DATE

NAME ____________ SER. NO. ______ CAL DATE

CONDUCTED BY ____________ NAME/AFFILIATION APPROVED BY ____________ NAME/AFFILIATION

Step	Parameter	Specification	Results
27.	RG Indication	0011 111 111 111 111	______
29.	RG Indication	0100 000 000 000 000	______
31.	RG Indication	0000 000 000 000 001	______
35.	RG Indication	1111 111 111 111 111	______
37.	RG Indication	1111 111 111 111 101	______
57.	RG Indication	0011 111 111 111 110	______
63.	RG Indication	0011 111 111 111 110	______
71.	RG Indication	0011 111 111 111 100	______
77.	RG Indication	0011 111 111 111 111	______
106.	RG Indication	0011 111 111 111 111	______
108.	RG Indication	0100 000 000 000 000	______
110.	RG Indication	0000 000 000 000 001	______
114.	RG Indication	1111 111 111 111 111	______

DATE ____________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC NO. 05790
REV. ______

JOB GYRO COUNTERS TEST

Step	Parameter	Specification	Results
116.	RG Indication	1111 111 111 111 101	______
136.	RG Indication	0011 111 111 111 110	______
142.	RG Indication	0011 111 111 111 110	______
150.	RG Indication	0011 111 111 111 100	______
156.	RG Indication	0011 111 111 111 111	______
185.	RG Indication	0011 111 111 111 111	______
187.	RG Indication	0100 000 000 000 000	______
189.	RG Indication	0000 000 000 000 001	______
193.	RG Indication	1111 111 111 111 111	______
195.	RG Indication	1111 111 111 111 101	______
215.	RG Indication	0011 111 111 111 110	______
221.	RG Indication	0011 111 111 111 110	______
229.	RG Indication	0011 111 111 111 100	______
235.	RG Indication	0011 111 111 111 111	______
255.	REG SEL Indication	1111 111 111 111 111	______
267.	REG SEL Indication	1101 010 101 010 101	______
279.	REG SEL Indication	0000 000 000 000 000	______
299.	FREQUENCY COUNTER Display	1024	______
309.	REG SEL Indication	BIT 10 is a "0"	______

DATE ____________

JDC 05792 REV. A PAGE 1 OF 13
INITIAL TDRR 35464 D.S. PGS 3

JOB LINK COUNTERS TEST

SUBSYSTEM Computer
ASSY. Block II C-Computer

DESCRIPTION

Tests the operation of the Link counters. The Inlink counter is checked under normal and marginal input conditions. The pulse count of an output sequence is checked to verify that the Outlink counter is operating properly. Downlink bit configuration, word rate, and pulse characteristics are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	8-6-68	36664	7	-	EA BD	-

REFERENCES
JDC's 05402, 05405, 05413, 05414, 05129, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set-up as specified in JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the XY Interface panel of the CTS.

3. Verify that the STRT1/STRT2 switch on the Buffer Circuit Assembly is in the OFF position.

4. Set the Y MARGINS switch to the V3 (Low One) position.

5. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

INLINK TEST

6. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

7. Press Keys CL, 00000, 00000.

8. Verify that the RZ display is 0000 000 000 000 000.

9. Verify that the REG SEL display is 0000 000 000 000 000.

10. Press the EXECUTE button.

11. Verify that the LINC indicator is on.

12. Press Keys CL, 00013, 00000.

13. Verify that the RZ display is 0000 000 000 001 011.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 18 JAN 68

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14. Verify that the REG SEL display is 0000 000 000 000 000.

15. Press the CHANNEL button.

16. Press the EXECUTE button.

17. Verify that the LINC indicator is on.

18. Press Keys CL, 00045, 00000.

19. Verify that the RZ display is 0000 000 000 100 101.

20. Verify that the REG SEL display is 0000 000 000 000 000.

21. Press the EXECUTE button.

22. Set the Agreement A switches to XXXX 0045.

23. Set the Agreement A function switch to the SAMPLE position.

24. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

25. Press Keys CL, 0000.

26. Verify that the RZ display is 0000 000 000 000 000.

27. Press the EXECUTE button.

28. Press the MONITOR indicator switch to the on (illuminated) position.

29. Set the AGC INPUT COUNTERS switch to position 9.

30. Press the POSITIVE indicator switch to the on (illuminated) position.

31. Press the CH33-10 indicator switch on the RDC INTERFACE to the on (illuminated) position.

32. Set the T12 COUNTER STOP switch to the OFF position.

33. Set the INCREMENTS INHIBIT switch to the OFF position.

34. Press the PROCEED button.

35. Verify that the RG display is 0000 000 000 000 000.

36. Press the SINGLE PULSE button three times.

37. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

38. Set the Y MARGINS switch to the V2 (High Zero) position.

39. Press the SINGLE PULSE button 3 times.

40. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

41. Set the Y MARGINS switch to the V3 position.

42. Press the POSITIVE indicator switch to the off (extinguished) position.

43. Press the NEGATIVE indicator switch to the on (illuminated) position.

44. Press the SINGLE PULSE button three times.

45. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

46. Set the Y MARGINS switch to the V2 position.

47. Press the SINGLE PULSE button three times.

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48. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

49. Set the Y MARGINS switch to the NORM position.

No Cross Link Input Check

50. Set the T12 COUNTER STOP switch to the ON position.

51. Set the AGC INPUT COUNTERS switch to position 10.

52. Set the T12 COUNTER STOP switch to the OFF position.

53. Press the PROCEED button.

54. Press the SINGLE PULSE button three times.

55. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

56. Set the Y MARGINS switch to the V2 position.

57. Press the SINGLE PULSE button three times.

58. Verify that the RG display is 0000 000 000 111 000.

59. Set the Y MARGINS switch to the NORM position.

60. Press the NEGATIVE indicator switch to the off (extinguished) position.

61. Press the POSITIVE indicator switch to the on (illuminated) position.

62. Press the SINGLE PULSE button three times.

63. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

64. Set the Y MARGINS switch to the V2 position.

65. Press the SINGLE PULSE button three times.

66. Verify that the RG display is 0000 000 000 111 000.

67. Set the Y MARGINS switch to the V3 position.

Cross Link Input Check

68. Set the INCREMENTS INHIBIT switch to the ON position.

69. Set the T12 COUNTER STOP switch to the ON position.

70. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

71. Press Keys CL, 00013, 00020.

72. Verify that the RZ display is 0000 000 000 001 011.

73. Verify that the REG SEL display is 0000 000 000 010 000.

74. Press the CHANNEL button.

75. Press the EXECUTE button.

76. Verify that the LINC indicator is on.

77. Press Keys CL, 00045, 00000.

78. Verify that the RZ display is 0000 000 000 100 101.

79. Verify that the REG SEL display is 0000 000 000 000 000.

80. Press the EXECUTE button.

81. Verify that the LINC indicator is on.

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82. Press the MONITOR indicator switch to the on (illuminated) position.

83. Set the INCREMENTS INHIBIT switch to the OFF position.

84. Set the T12 COUNTER STOP switch to the OFF position.

85. Press the PROCEED button.

86. Press the SINGLE PULSE button three times.

87. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

88. Set the Y MARGINS switch to the V2 position.

89. Press the SINGLE PULSE button three times.

90. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

91. Set the Y MARGINS switch to the V3 position.

92. Press the POSITIVE indicator switch to the off (extinguished) position.

93. Press the NEGATIVE indicator switch to the on (illuminated) position.

94. Press the SINGLE PULSE button three times.

95. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

96. Set the Y MARGINS switch to the V2 position.

97. Press the SINGLE PULSE button three times.

98. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

99. Set the Y MARGINS switch to the NORM position.

No Uplink Input Check

100. Set the T12 COUNTER STOP switch to the ON position.

101. Set the AGC INPUT COUNTERS switch to position 9.

102. Set the T12 COUNTER STOP switch to the OFF position.

103. Press the PROCEED button.

104. Press the SINGLE PULSE button three times.

105. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

106. Set the Y MARGINS switch to the V2 position.

107. Press the SINGLE PULSE button three times.

108. Verify that the RG display is 0000 000 000 111 000.

109. Set the Y MARGINS switch to the NORM position.

110. Press the NEGATIVE indicator switch to the off (extinguished) position.

111. Press the POSITIVE indicator switch to the on (illuminated) position.

112. Press the SINGLE PULSE button three times.

113. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

114. Set the Y MARGINS switch to the V2 position.

115. Press the SINGLE PULSE button three times.

116. Verify that the RG display is 0000 000 000 111 000.

117. Set the Y MARGINS switch to the NORM position.

Cross Link Rate Check

118. Set the AGC INPUT COUNTERS switch to position 10.

119. Set the INCREMENTS INHIBIT switch to the ON position.

120. Set the T12 COUNTER STOP switch to the ON position.

121. Press the SINGLE PULSE indicator switch to the off (extinguished) position.

122. Press the STANDARD RATE indicator switch to the on (illuminated) position.

123. Press the READ AGC indicator switch to the on (illuminated) position.

124. Press Keys CL, 0033.

125. Verify that the RZ display is 0000 000 000 011 011.

126. Press the CHANNEL button.

127. Press the EXECUTE button.

128. Verify that the OINC indicator is on.

129. Verify that bit 11 of the REG SEL display is a "1".

130. Set the INCREMENTS INHIBIT switch to the OFF position.

131. Set the T12 COUNTER STOP switch to the OFF position.

132. Press the PROCEED button.

133. Set the INCREMENTS INHIBIT switch to the ON position.

134. Set the T12 COUNTER STOP switch to the ON position.

135. Press Keys CL, 0033.

136. Verify that the RZ display is 0000 000 000 011 011.

137. Press the CHANNEL button.

138. Press the EXECUTE button.

139. Verify that the OINC indicator is on.

140. Verify that bit 11 of the REG SEL display is a "1". Stamp data sheet.

141. Press the STANDARD RATE indicator switch to the off (extinguished) position.

142. Press the ALARM RATE indicator switch to the on (illuminated) position.

143. Set the INCREMENTS INHIBIT switch to the OFF position.

144. Set the T12 COUNTER STOP switch to the OFF position.

145. Press the PROCEED button.

146. Set the INCREMENTS INHIBIT switch to the ON position.

147. Set the T12 COUNTER STOP switch to the ON position.

148. Press Keys CL, 0033.

149. Verify that the RZ display is 0000 000 000 011 011.

150. Press the CHANNEL button.

151. Press the EXECUTE button.

152. Verify that the OINC indicator is on.

153. Verify that bit 11 of the REG SEL display is a "0". Stamp data sheet.

154. Press the ALARM RATE indicator switch to the off (extinguished) position.

155. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

Block Uplink Check

156. Set the AGC INPUT COUNTERS switch to position 9.

157. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

158. Press Keys CL, 00045, 00000.

159. Verify that the RZ display is 0000 000 000 100 101.

160. Verify that the REG SEL display is 0000 000 000 000 000.

161. Press the EXECUTE button.

162. Verify that the LINC indicator is on.

163. Press the MONITOR indicator switch to the on (illuminated) position.

164. Press the CH33-10 indicator switch on the RDC INTERFACE panel to the off (extinguished) position.

165. Set the INCREMENTS INHIBIT switch to the OFF position.

166. Set the T12 COUNTER STOP switch to the OFF position.

167. Press the PROCEED button.

168. Verify that the RG display is 0000 000 000 000 000.

169. Press the SINGLE PULSE button three times.

170. Verify that the RG display is 0000 000 000 000 000. Stamp data sheet.

171. Press the POSITIVE indicator switch to the off (extinguished) position.

172. Press the NEGATIVE indicator switch to the on (illuminated) position.

173. Press the SINGLE PULSE button three times.

174. Verify that the RG display is 0000 000 000 000 000. Stamp data sheet.

175. Set the INCREMENTS INHIBIT switch to the ON position.

176. Set the T12 COUNTER STOP switch to the ON position.

177. Press the CH33-10 indicator switch on the RDC INTERFACE panel to the on (illuminated) position.

Block Inlink Check

178. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

179. Press Keys CL, 00013, 00040.

180. Verify that the RZ display is 0000 000 000 001 011.

181. Verify that the REG SEL display is 0000 000 000 100 000.

182. Press the CHANNEL button.

183. Press the EXECUTE button.

184. Verify that the LINC indicator is on.

185. Press the MONITOR indicator switch to the on (illuminated) position.

186. Press the CL Key.

187. Press the EXECUTE button.

188. Set the INCREMENTS INHIBIT switch to the OFF position.

189. Set the T12 COUNTER STOP switch to the OFF position.

190. Press the PROCEED button.

191. Verify that the RG display is 0000 000 000 000 000.

192. Press the SINGLE PULSE button three times.

193. Verify that the RG display is 0000 000 000 000 000.

194. Set the AGC INPUT COUNTER switch to position 10.

195. Press the SINGLE PULSE button three times.

196. Verify that the RG display is 0000 000 000 000 000.

197. Press the NEGATIVE indicator switch to the off (extinguished) position.

198. Press the POSITIVE indicator switch to the on (illuminated) position.

199. Press the SINGLE PULSE button three times.

200. Verify that the RG display is 0000 000 000 000 000. Stamp data sheet.

201. Set the AGC INPUT COUNTER switch to position 9.

202. Press the SINGLE PULSE button three times.

203. Verify that the RG display is 0000 000 000 000 000. Stamp data sheet.

204. Set the INCREMENTS INHIBIT switch to the ON position.

205. Set the T12 COUNTER STOP switch to the ON position.

206. Press the POSITIVE indicator switch to the off (extinguished) position.

207. Press the SINGLE PULSE switch to the off (extinguished) position.

208. Set the AGC INPUT COUNTERS switch to position 1.

209. Set the Agreement A function switch to the OFF position.

OUTLINK TEST

210. Press the LOAD CHAN 8 510 OHMS indicator switch to the on (illuminated) position.

211. Set the FREQ + PHASE switch to the FR T T → S position.

212. Prepare the CTS FREQUENCY COUNTER for operation as specified in step 1 of JDC 05402.

NOTE: During this test,
the FREQUENCY COUNTER
is to be operated as described
under PROCEDURE on
JDC 05402.

213. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

214. Press Keys CL, 00057, 77777.

215. Verify that the RZ display is 0000 000 000 101 111.

216. Verify that the REG SEL display is 0111 111 111 111 111.

217. Press the EXECUTE button.

218. Verify that the LINC indicator is on.

219. Press the READ AGC indicator switch to the on (illuminated) position.

220. Press Keys CL, 0057.

221. Verify that the RZ display is 0000 000 000 101 111.

222. Press the EXECUTE button.

223. Verify that the OINC indicator is on.

224. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

225. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

226. Press Keys CL, 00057, 52525.

227. Verify that the RZ display is 0000 000 000 101 111.

228. Verify that the REG SEL display is 0101 010 101 010 101.

229. Press the EXECUTE button.

230. Verify that the LINC indicator is on.

231. Press the READ AGC indicator switch to the on (illuminated) position.

232. Press Keys CL, 0057.

233. Verify that the RZ display is 0000 000 000 101 111.

234. Press the EXECUTE button.

235. Verify that the OINC indicator is on.

236. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

237. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

238. Press Keys CL, 00057, 00000.

239. Verify that the RZ display is 0000 000 000 101 111.

240. Verify that the REG SEL display is 0000 000 000 000 000.

241. Press the EXECUTE button.

242. Verify that the LINC indicator is on.

243. Press the READ AGC indicator switch to the on (illuminated) position.

244. Press Keys CL, 0057.

245. Press the EXECUTE button.

246. Verify that the OINC indicator is on.

247. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

DOWNLINK TEST

248. Inspect the signal cabling between the XY Interface Panel and the Oscilloscope panels for the connections specified in JDC 05129, step 12.

> NOTE: The operational procedure for the CTS Oscilloscope specified in JDC 05405 are to be used in performing this test, except where specified in the procedure below.

249. Verify that a cable is connected between the EXT SYNC jack of the INTERFACE SIGNALS connector plate, and the EXT TRIG input jack of the NORMAL AND DELAYING TRIGGERING section of the Oscilloscope.

250. On the NORMAL AND DELAYING TRIGGERING section of the Oscilloscope:

- a. Set the SOURCE switch to the EXT position.
- b. Set the COUPLING switch to the DC position.
- c. Verify that the SLOPE switch is in the + position.

251. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

252. Press Keys CL, 00100, 52525.

253. Press the EXECUTE button.

254. Press Keys CL, 00101, 30100.

255. Press the EXECUTE button.

256. Press Keys CL, 00102, 00006.

257. Press the EXECUTE button.

258. Press Keys CL, 00103, 01034.

259. Press the EXECUTE button.

260. Press Keys CL, 00104, 30100.

261. Press the EXECUTE button.

262. Press Keys CL, 00105, 00006.

263. Press the EXECUTE button.

264. Press Keys CL, 00106, 01035.

265. Press the EXECUTE button.

266. Press Keys CL, 00107, 00101.

267. Press the EXECUTE button.

268. Press Keys CL, 00013, 00100.

269. Press the CHANNEL button.

270. Press the EXECUTE button.

271. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

272. Press Keys CL, 0101.

273. Press the EXECUTE button.

274. Press the MONITOR indicator switch to the on (illuminated) position.

275. Set the T12 COUNTER STOP and INCREMENTS INHIBIT switches to the OFF position.

276. Press the PROCEED button.

277. Set the CHANNEL 8 switches to position 102.

278. Set the SCOPE switch to the 8 position.

279. Press the DL ENABLE indicator switch to the on (illuminated) position.

280. Press the WORD RATE 50 PPS indicator switch to the on (illuminated) position.

281. Verify that the Oscilloscope displays the pulse configuration shown on Figure 1. Stamp data sheet.

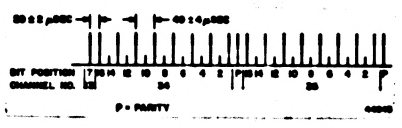

Figure 1

282. Set the CHANNEL 8 switches to position 103.

283. Verify that the Oscilloscope displays the pulse configuration shown on Figure 1. Stamp data sheet.

284. Set the NISQ COUNTER STOP switch to the ON position.

285. Set the T12 COUNTER STOP switch to the ON position.

286. Set the NISQ COUNTER STOP switch to the OFF position.

287. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

288. Press Keys CL, 00100, 00006.

289. Press the EXECUTE button.

290. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

291. Press Keys CL, 0101.

292. Press the EXECUTE button.

293. Press the MONITOR indicator switch to the on (illuminated) position.

294. Set the T12 COUNTER STOP switch to the OFF position.

295. Press the PROCEED button.

296. Set the CHANNEL 8 switches to position 102.

297. Verify that the Oscilloscope displays the pulse configuration shown on Figure 2. Stamp data sheet.

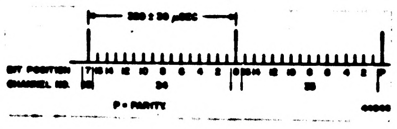

Figure 2

298. Set the CHANNEL 8 switches to position 103.

299. Verify that the Oscilloscope displays the pulse configuration shown on Figure 2. Stamp data sheet.

300. Set the NISQ COUNTER STOP switch to the ON position.

301. Set the T12 COUNTER STOP switch to the ON position.

302. Set the NISQ COUNTER STOP switch to the OFF position.

303. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

304. Press Keys CL, 00100, 77777.

305. Press the EXECUTE button.

306. Press Keys CL, 00013, 00000.

307. Press the CHANNEL button.

308. Press the EXECUTE button.

309. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

310. Press Keys CL, 0101.

311. Press the EXECUTE button.

312. Press the MONITOR indicator switch to the on (illuminated) position.

313. Set the T12 COUNTER STOP switch to the OFF position.

314. Press the PROCEED button.

315. Set the CHANNEL 8 switches to position 102.

316. Verify that the Oscilloscope displays the pulse configuration shown on Figure 3. Stamp data sheet.

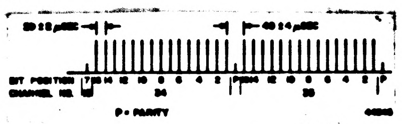

Figure 3

317. Set the CHANNEL 8 switches to position 103.

318. Verify that the Oscilloscope displays the pulse configuration shown on Figure 3. Stamp data sheet.

319. Set the NISQ COUNTER STOP switch to the ON position.

320. Set the T12 COUNTER STOP switch to the ON position.

321. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

322. Set the NISQ COUNTER STOP switch to the OFF position.

323. Press Keys CL, 00100, 25252.

324. Press the EXECUTE button.

325. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

326. Press Keys CL, 0101.

327. Press the EXECUTE button.

328. Press the MONITOR indicator switch to the on (illuminated) position.

329. Set the T12 COUNTER STOP switch to the OFF position.

330. Press the PROCEED button.

331. Set the CHANNEL 8 switches to position 102.

332. Verify that the Oscilloscope displays the pulse configuration shown on Figure 4. Stamp data sheet.

333. Set the CHANNEL 8 switches to position 103.

334. Verify that the Oscilloscope displays the pulse configuration shown on Figure 4. Stamp data sheet.

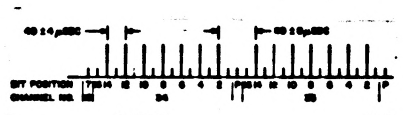

Figure 4

Downlink Too Fast

335. Set the NISQ COUNTER STOP switch to the ON position.

336. Set the T12 COUNTER STOP switch to the ON position.

337. Set the NISQ COUNTER STOP switch to the OFF position.

338. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

339. Press Keys CL, 00033, 00000.

340. Press the CHANNEL button.

341. Press the EXECUTE button.

342. Press the READ-AGC indicator switch to the on (illuminated) position.

343. Press Keys CL, 0033.

344. Press the CHANNEL button.

345. Press the EXECUTE button.

346. Verify that the RG display is XXXX 111 111 111 111. Stamp data sheet.

347. Press the WORD RATE 50 PPS indicator switch to the off (extinguished) position.

348. Press the WORD RATE 300 PPS indicator switch to the on (illuminated) position.

349. Press Keys CL, 0033.

350. Press the CHANNEL button.

351. Press the EXECUTE button.

352. Verify that the RG display is XXXX 011 111 111 111. Stamp data sheet.

353. Press the WORD RATE 300 PPS indicator switch to the off (extinguished) position.

354. Press the WORD RATE 50 PPS indicator switch to the on (illuminated) position.

Pulse Characteristics

355. Set the Oscilloscope NORMAL AND DELAYING TRIGGERING SOURCE switch to the INT position, and press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

356. Press Keys CL, 0101.

357. Press the EXECUTE button.

358. Press the MONITOR indicator switch to the on (illuminated) position.

359. Set the T12 COUNTER STOP switch to the OFF position.

360. Press the PROCEED button.

361. Set the CHANNEL 8 switches to position 102.

362. Measure and record the pulse characteristics displayed as specified by Figure 5.

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SUBSYSTEM Computer	**ASSY** Block II C-Computer

363. Set the CHANNEL 5 switches to position 103.

364. Measure and record the pulse characteristics displayed as specified by Figure 5.

365. Set the T12 COUNTER STOP switch to the ON position.

366. Press the WORD RATE 50 PPS indicator switch to the off (extinguished) position.

367. Press the DL ENABLE indicator switch to the off (extinguished) position.

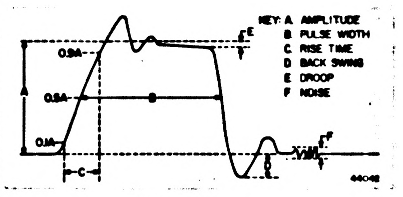

Figure 5

DATE 18 JAN 68

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC
NO. 05792
REV. A
INITIAL TDRR 35464

JOB LINK COUNTERS TEST

ASSEMBLY UNDER TEST	TEST HISTORY
TITLE ______	DATE ______ START ______ END ______ SITE / LOCATION
SER. NO. ______ DWG ______ REV. ______	TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
37	RG Indication	0000 000 000 000 111	
40	RG Indication	0000 000 000 000 111	
45	RG Indication	0000 000 000 111 000	
48	RG Indication	0000 000 000 111 000	
55	RG Indication	0000 000 000 111 000	
63	RG Indication	0000 000 000 111 000	
81 87	RG Indication	0000 000 000 000 111	
10 90	RG Indication	0000 000 000 000 111	
95 95	RG Indication	0000 000 000 111 000	
99 98	RG Indication	0000 000 000 111 000	
105 105	RG Indication	0000 000 000 111 000	
113 113	RG Indication	0000 000 000 111 000	
140	REG SEL Indication	BIT 11 is a "1"	
153	REG SEL Indication	BIT 11 is a "0"	
170 170	RG Indication	0000 000 000 000 000	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05792
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JOB LINK COUNTERS TEST

Step	Parameter	Specification	Results
174	RG Indication	0000 000 000 000 000	
200	RG Indication	0000 000 000 000 000	
203	RG Indication	0000 000 000 000 000	
224	REG SEL Indication	1111 111 111 111 111	
236	REG SEL Indication	1101 010 101 010 101	
247	REG SEL Indication	0000 000 000 000 000	
281	Oscilloscope display agrees with Figure 1		
283	Oscilloscope display agrees with Figure 1		
297	Oscilloscope display agrees with Figure 2		
299	Oscilloscope display agrees with Figure 2		
316	Oscilloscope display agrees with Figure 3		
318	Oscilloscope display agrees with Figure 3		
332	Oscilloscope display agrees with Figure 4		
334	Oscilloscope display agrees with Figure 4		
346	RG Indication	XXXX 111 111 111 111	
352	RG Indication	XXXX 011 111 111 111	
362	Pulse Characteristics (X-017)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 Vp-p	

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 3

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JOB LINK COUNTERS TEST

Step	Parameter	Specification	Results
364	Pulse Characteristics (X-085)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 Vp-p	

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JOB LINK COUNTERS TEST

INITIAL TDRR 35464 D.S. PGS 3

SUBSYSTEM Computer

ASSY. Block II C-Computer

DESCRIPTION

Tests the operation of the Link counters. The Inlink counter is checked under normal and marginal input conditions. The pulse count of an output sequence is checked to verify that the Outlink counter is operating properly. Downlink bit configuration, word rate, and pulse characteristics are also checked.

Rev. Ltr.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES JDC's 05402, 05405, 05413, 05414, 05129, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Programmer and Monitor and Logic Drawer No. 2 Panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set-up as specified in JDC 05414.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel, the Logic Drawer No. 2 panel and the XY Interface panel of the CTS.

3. Verify that the STRT1/STRT2 switch on the Buffer Circuit Assembly is in the OFF position.

4. Set the Y MARGINS switch to the V3 (Low One) position.

5. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

INLINK TEST

6. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

7. Press Keys CL, 00000, 00000.

8. Verify that the RZ display is 0000 000 000 000 000.

9. Verify that the REG SEL display is 0000 000 000 000 000.

10. Press the EXECUTE button.

11. Verify that the LINC indicator is on.

12. Press Keys CL, 00013, 00000.

13. Verify that the RZ display is 0000 000 000 001 011.

VERIFICATION WITH SIDL REQUIRED BEFORE USE   DATE ________

JOB LINK COUNTERS TEST   JDC 05792 REV   PAGE 2 OF 13

SUBSYSTEM Computer   **ASSY** Block II C-Computer

14. Verify that the REG SEL display is 0000 000 000 000 000.

15. Press the CHANNEL button.

16. Press the EXECUTE button.

17. Verify that the LINC indicator is on.

18. Press Keys CL, 00045, 00000.

19. Verify that the RZ display is 0000 000 000 100 101.

20. Verify that the REG SEL display is 0000 000 000 000 000.

21. Press the EXECUTE button.

22. Set the Agreement A switches to XXXX 0045.

23. Set the Agreement A function switch to the SAMPLE position.

24. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

25. Press Keys CL, 0000.

26. Verify that the RZ display is 0000 000 000 000 000.

27. Press the EXECUTE button.

28. Press the MONITOR indicator switch to the on (illuminated) position.

29. Set the AGC INPUT COUNTERS switch to position 9.

30. Press the POSITIVE indicator switch to the on (illuminated) position.

31. Press the CH33-10 indicator switch on the RDC INTERFACE to the on (illuminated) position.

32. Set the T12 COUNTER STOP switch to the OFF position.

33. Set the INCREMENTS INHIBIT switch to the OFF position.

34. Press the PROCEED button.

35. Verify that the RG display is 0000 000 000 000 000.

36. Press the SINGLE PULSE button three times.

37. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

38. Set the Y MARGINS switch to the V2 (High Zero) position.

39. Press the SINGLE PULSE button 3 times.

40. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

41. Set the Y MARGINS switch to the V3 position.

42. Press the POSITIVE indicator switch to the off (extinguished) position.

43. Press the NEGATIVE indicator switch to the on (illuminated) position.

44. Press the SINGLE PULSE button three times.

45. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

46. Set the Y MARGINS switch to the V2 position.

47. Press the SINGLE PULSE button three times.

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JOB LINK COUNTERS TEST   JDC 05792 REV   PAGE 3 OF 13

SUBSYSTEM Computer   **ASSY** Block II C-Computer

48. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

49. Set the Y MARGINS switch to the NORM position.

No Cross Link Input Check

50. Set the T12 COUNTER STOP switch to the ON position.

51. Set the AGC INPUT COUNTERS switch to position 10.

52. Set the T12 COUNTER STOP switch to the OFF position.

53. Press the PROCEED button.

54. Press the SINGLE PULSE button three times.

55. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

56. Set the Y MARGINS switch to the V2 position.

57. Press the SINGLE PULSE button three times.

58. Verify that the RG display is 0000 000 000 111 000.

59. Set the Y MARGINS switch to the NORM position.

60. Press the NEGATIVE indicator switch to the off (extinguished) position.

61. Press the POSITIVE indicator switch to the on (illuminated) position.

62. Press the SINGLE PULSE button three times.

63. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

64. Set the Y MARGINS switch to the V2 position.

65. Press the SINGLE PULSE button three times.

66. Verify that the RG display is 0000 000 000 111 000.

67. Set the Y MARGINS switch to the V3 position.

Cross Link Input Check

68. Set the INCREMENTS INHIBIT switch to the ON position.

69. Set the T12 COUNTER STOP switch to the ON position.

70. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

71. Press Keys CL, 00013, 00020.

72. Verify that the RZ display is 0000 000 000 001 011.

73. Verify that the REG SEL display is 0000 000 000 010 000.

74. Press the CHANNEL button.

75. Press the EXECUTE button.

76. Verify that the LINC indicator is on.

77. Press Keys CL, 00045, 00000.

78. Verify that the RZ display is 0000 000 000 100 101.

79. Verify that the REG SEL display is 0000 000 000 000 000.

80. Press the EXECUTE button.

81. Verify that the LINC indicator is on.

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JOB LINK COUNTERS TEST   JDC 05792 REV   PAGE 4 OF 13

SUBSYSTEM Computer   **ASSY** Block II C-Computer

82. Press the MONITOR indicator switch to the on (illuminated) position.

83. Set the INCREMENTS INHIBIT switch to the OFF position.

84. Set the T12 COUNTER STOP switch to the OFF position.

85. Press the PROCEED button.

86. Press the SINGLE PULSE button three times.

87. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

88. Set the Y MARGINS switch to the V2 position.

89. Press the SINGLE PULSE button three times.

90. Verify that the RG display is 0000 000 000 000 111. Stamp data sheet.

91. Set the Y MARGINS switch to the V3 position.

92. Press the POSITIVE indicator switch to the off (extinguished) position.

93. Press the NEGATIVE indicator switch to the on (illuminated) position.

94. Press the SINGLE PULSE button three times.

95. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

96. Set the Y MARGINS switch to the V2 position.

97. Press the SINGLE PULSE button three times.

98. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

99. Set the Y MARGINS switch to the NORM position.

No Uplink Input Check

100. Set the T12 COUNTER STOP switch to the ON position.

101. Set the AGC INPUT COUNTERS switch to position 9.

102. Set the T12 COUNTER STOP switch to the OFF position.

103. Press the PROCEED button.

104. Press the SINGLE PULSE button three times.

105. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

106. Set the Y MARGINS switch to the V2 position.

107. Press the SINGLE PULSE button three times.

108. Verify that the RG display is 0000 000 000 111 000.

109. Set the Y MARGINS switch to the NORM position.

110. Press the NEGATIVE indicator switch to the off (extinguished) position.

111. Press the POSITIVE indicator switch to the on (illuminated) position.

112. Press the SINGLE PULSE button three times.

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113. Verify that the RG display is 0000 000 000 111 000. Stamp data sheet.

114. Set the Y MARGINS switch to the V2 position.

115. Press the SINGLE PULSE button three times.

116. Verify that the RG display is 0000 000 000 111 000.

117. Set the Y MARGINS switch to the NORM position.

Cross Link Rate Check

118. Set the AGC INPUT COUNTERS switch to position 10.

119. Set the INCREMENTS INHIBIT switch to the ON position.

120. Set the T12 COUNTER STOP switch to the ON position.

121. Press the SINGLE PULSE indicator switch to the off (extinguished) position.

122. Press the STANDARD RATE indicator switch to the on (illuminated) position.

123. Press the READ AGC indicator switch to the on (illuminated) position.

124. Press Keys CL, 0033.

125. Verify that the RZ display is 0000 000 000 011 011.

126. Press the CHANNEL button.

127. Press the EXECUTE button.

128. Verify that the OINC indicator is on.

129. Verify that bit 11 of the REG SEL display is a "1".

130. Set the INCREMENTS INHIBIT switch to the OFF position.

131. Set the T12 COUNTER STOP switch to the OFF position.

132. Press the PROCEED button.

133. Set the INCREMENTS INHIBIT switch to the ON position.

134. Set the T12 COUNTER STOP switch to the ON position.

135. Press Keys CL, 0033.

136. Verify that the RZ display is 0000 000 000 011 011.

137. Press the CHANNEL button.

138. Press the EXECUTE button.

139. Verify that the OINC indicator is on.

140. Verify that bit 11 of the REG SEL display is a "1". Stamp data sheet.

141. Press the STANDARD RATE indicator switch to the off (extinguished) position.

142. Press the ALARM RATE indicator switch to the on (illuminated) position.

143. Set the INCREMENTS INHIBIT switch to the OFF position.

144. Set the T12 COUNTER STOP switch to the OFF position.

145. Press the PROCEED button.

146. Set the INCREMENTS INHIBIT switch to the ON position.

147. Set the T12 COUNTER STOP switch to the ON position.

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148. Press Keys CL, 0033.

149. Verify that the RZ display is 0000 000 000 011 011.

150. Press the CHANNEL button.

151. Press the EXECUTE button.

152. Verify that the OINC indicator is on.

153. Verify that bit 11 of the REG SEL display is a "0". Stamp data sheet.

154. Press the ALARM RATE indicator switch to the off (extinguished) position.

155. Press the SINGLE PULSE indicator switch to the on (illuminated) position.

Block Uplink Check

156. Set the AGC INPUT COUNTERS switch to position 9.

157. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

158. Press Keys CL, 00045, 00000.

159. Verify that the RZ display is 0000 000 000 100 101.

160. Verify that the REG SEL display is 0000 000 000 000 000.

161. Press the EXECUTE button.

162. Verify that the LINC indicator is on.

163. Press the MONITOR indicator switch to the on (illuminated) position.

164. Press the CH33-10 indicator switch on the RDC INTERFACE panel to the off (extinguished) position.

165. Set the INCREMENTS INHIBIT switch to the OFF position.

166. Set the T12 COUNTER STOP switch to the OFF position.

167. Press the PROCEED button.

168. Verify that the RG display is 0000 000 000 000 000.

169. Press the SINGLE PULSE button three times.

170. Verify that the RG display is 0000 000 000 000 000. Stamp data sheet.

171. Press the POSITIVE indicator switch to the off (extinguished) position.

172. Press the NEGATIVE indicator switch to the on (illuminated) position.

173. Press the SINGLE PULSE button three times.

174. Verify that the RG display is 0000 000 000 000 000. Stamp data sheet.

175. Set the INCREMENTS INHIBIT switch to the ON position.

176. Set the T12 COUNTER STOP switch to the ON position.

177. Press the CH33-10 indicator switch on the RDC INTERFACE panel to the on (illuminated) position.

Block Inlink Check

178. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

179. Press Keys CL, 00013, 00040.

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180. Verify that the RZ display is 0000 000 000 001 011.

181. Verify that the REG SEL display is 0000 000 000 100 000.

182. Press the CHANNEL button.

183. Press the EXECUTE button.

184. Verify that the LINC indicator is on.

185. Press the MONITOR indicator switch to the on (illuminated) position.

186. Press the CL Key.

187. Press the EXECUTE button.

188. Set the INCREMENTS INHIBIT switch to the OFF position.

189. Set the T12 COUNTER STOP switch to the OFF position.

190. Press the PROCEED button.

191. Verify that the RG display is 0000 000 000 000 000.

192. Press the SINGLE PULSE button three times.

193. Verify that the RG display is 0000 000 000 000 000.

194. Set the AGC INPUT COUNTER switch to position 10.

195. Press the SINGLE PULSE button three times.

196. Verify that the RG display is 0000 000 000 000 000.

197. Press the NEGATIVE indicator switch to the off (extinguished) position.

198. Press the POSITIVE indicator switch to the on (illuminated) position.

199. Press the SINGLE PULSE button three times.

200. Verify that the RG display is 0000 000 000 000 000. Stamp data sheet.

201. Set the AGC INPUT COUNTER switch to position 9.

202. Press the SINGLE PULSE button three times.

203. Verify that the RG display is 0000 000 000 000 000. Stamp data sheet.

204. Set the INCREMENTS INHIBIT switch to the ON position.

205. Set the T12 COUNTER STOP switch to the ON position.

206. Press the POSITIVE indicator switch to the off (extinguished) position.

207. Press the SINGLE PULSE switch to the off (extinguished) position.

208. Set the AGC INPUT COUNTERS switch to position 1.

209. Set the Agreement A function switch to the OFF position.

OUTLINK TEST

210. Press the LOAD CHAN T 510 OHMS indicator switch to the on (illuminated) position.

211. Set the FREQ + PHASE switch to the FR T T → 8 position.

212. Prepare the CTS FREQUENCY COUNTER for operation as specified in step 1 of JDC 05402.

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NOTE: During this test,
the FREQUENCY COUNTER
is to be operated as described
under PROCEDURE on
JDC 05402.

213. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

214. Press Keys CL, 00057, 77777.

215. Verify that the RZ display is 0000 000 000 101 111.

216. Verify that the REG SEL display is 0111 111 111 111 111.

217. Press the EXECUTE button.

218. Verify that the LINC indicator is on.

219. Press the READ AGC indicator switch to the on (illuminated) position.

220. Press Keys CL, 0057.

221. Verify that the RZ display is 0000 000 000 101 111.

222. Press the EXECUTE button.

223. Verify that the OINC indicator is on.

224. Verify that the REG SEL display is 1111 111 111 111 111. Stamp data sheet.

225. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

226. Press Keys CL, 00057, 52525.

227. Verify that the RZ display is 0000 000 000 101 111.

228. Verify that the REG SEL display is 0101 010 101 010 101.

229. Press the EXECUTE button.

230. Verify that the LINC indicator is on.

231. Press the READ AGC indicator switch to the on (illuminated) position.

232. Press Keys CL, 0057.

233. Verify that the RZ display is 0000 000 000 101 111.

234. Press the EXECUTE button.

235. Verify that the OINC indicator is on.

236. Verify that the REG SEL display is 1101 010 101 010 101. Stamp data sheet.

237. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

238. Press Keys CL, 00057, 00000.

239. Verify that the RZ display is 0000 000 000 101 111.

240. Verify that the REG SEL display is 0000 000 000 000 000.

241. Press the EXECUTE button.

242. Verify that the LINC indicator is on.

243. Press the READ AGC indicator switch to the on (illuminated) position.

244. Press Keys CL, 0057.

245. Press the EXECUTE button.

246. Verify that the OINC indicator is on.

247. Verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

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DOWNLINK TEST

248. Inspect the signal cabling between the XY Interface Panel and the Oscilloscope panels for the connections specified in JDC 05129, step 12.

> NOTE: The operational procedure for the CTS Oscilloscope specified in JDC 05405 are to be used in performing this test, except where specified in the procedure below.

249. Verify that a cable is connected between the EXT SYNC jack of the INTERFACE SIGNALS connector plate, and the EXT TRIG input jack of the NORMAL AND DELAYING TRIGGERING section of the Oscilloscope.

250. On the NORMAL AND DELAYING TRIGGERING section of the Oscilloscope:

- a. Set the SOURCE switch to the EXT position.
- b. Set the COUPLING switch to the DC position.
- c. Verify that the SLOPE switch is in the + position.

251. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

252. Press Keys CL, 00100, 52525.

253. Press the EXECUTE button.

254. Press Keys CL, 00101, 30100.

255. Press the EXECUTE button.

256. Press Keys CL, 00102, 00006.

257. Press the EXECUTE button.

258. Press Keys CL, 00103, 01034.

259. Press the EXECUTE button.

260. Press Keys CL, 00104, 30100.

261. Press the EXECUTE button.

262. Press Keys CL, 00105, 00006.

263. Press the EXECUTE button.

264. Press Keys CL, 00106, 01035.

265. Press the EXECUTE button.

266. Press Keys CL, 00107, 00101.

267. Press the EXECUTE button.

268. Press Keys CL, 00013, 00100.

269. Press the CHANNEL button.

270. Press the EXECUTE button.

271. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

272. Press Keys CL, 0101.

273. Press the EXECUTE button.

274. Press the MONITOR indicator switch to the on (illuminated) position.

275. Set the T12 COUNTER STOP and INCREMENTS INHIBIT switches to the OFF position.

276. Press the PROCEED button.

277. Set the CHANNEL S switches to position 102.

278. Set the SCOPE switch to the S position.

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279. Press the DL ENABLE indicator switch to the on (illuminated) position.

280. Press the WORD RATE 50 PPS indicator switch to the on (illuminated) position.

281. Verify that the Oscilloscope displays the pulse configuration shown on Figure 1. Stamp data sheet.

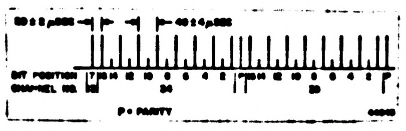

Figure 1

282. Set the CHANNEL S switches to position 103.

283. Verify that the Oscilloscope displays the pulse configuration shown on Figure 1. Stamp data sheet.

284. Set the NISQ COUNTER STOP switch to the ON position.

285. Set the T12 COUNTER STOP switch to the ON position.

286. Set the NISQ COUNTER STOP switch to the OFF position.

287. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

288. Press Keys CL, 00100, 00000.

289. Press the EXECUTE button.

290. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

291. Press Keys CL, 0101.

292. Press the EXECUTE button.

293. Press the MONITOR indicator switch to the on (illuminated) position.

294. Set the T12 COUNTER STOP switch to the OFF position.

295. Press the PROCEED button.

296. Set the CHANNEL S switches to position 102.

297. Verify that the Oscilloscope displays the pulse configuration shown on Figure 2. Stamp data sheet.

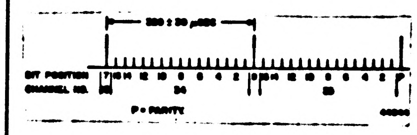

Figure 2

298. Set the CHANNEL S switches to position 103.

299. Verify that the Oscilloscope displays the pulse configuration shown on Figure 2. Stamp data sheet.

300. Set the NISQ COUNTER STOP switch to the ON position.

301. Set the T12 COUNTER STOP switch to the ON position.

302. Set the NISQ COUNTER STOP switch to the OFF position.

303. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

DATE ________

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304. Press Keys CL, 00100, 77777.

305. Press the EXECUTE button.

306. Press Keys CL, 00013, 00000.

307. Press the CHANNEL button.

308. Press the EXECUTE button.

309. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

310. Press Keys CL, 0101.

311. Press the EXECUTE button.

312. Press the MONITOR indicator switch to the on (illuminated) position.

313. Set the T12 COUNTER STOP switch to the OFF position.

314. Press the PROCEED button.

315. Set the CHANNEL S switches to position 102.

316. Verify that the Oscilloscope displays the pulse configuration shown on Figure 3. Stamp data sheet.

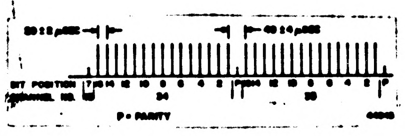

Figure 3

317. Set the CHANNEL S switches to position 103.

318. Verify that the Oscilloscope displays the pulse configuration shown on Figure 3. Stamp data sheet.

319. Set the NISQ COUNTER STOP switch to the ON position.

320. Set the T12 COUNTER STOP switch to the ON position.

321. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

322. Set the NISQ COUNTER STOP switch to the OFF position.

323. Press Keys CL, 00100, 25252.

324. Press the EXECUTE button.

325. Press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

326. Press Keys CL, 0101.

327. Press the EXECUTE button.

328. Press the MONITOR indicator switch to the on (illuminated) position.

329. Set the T12 COUNTER STOP switch to the OFF position.

330. Press the PROCEED button.

331. Set the CHANNEL S switches to position 102.

332. Verify that the Oscilloscope displays the pulse configuration shown on Figure 4. Stamp data sheet.

333. Set the CHANNEL S switches to position 103.

DATE ________

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334. Verify that the Oscilloscope displays the pulse configuration shown on Figure 4. Stamp data sheet.

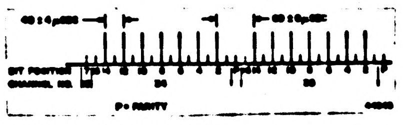

Figure 4

Downlink Too Fast

335. Set the NISQ COUNTER STOP switch to the ON position.

336. Set the T12 COUNTER STOP switch to the ON position.

337. Set the NISQ COUNTER STOP switch to the OFF position.

338. Press the KEYBOARD LOAD indicator switch to the on (illuminated) position.

339. Press Keys CL, 00033, 00000.

340. Press the CHANNEL button.

341. Press the EXECUTE button.

342. Press the READ-AGC indicator switch to the on (illuminated) position.

343. Press Keys CL, 0033.

344. Press the CHANNEL button.

345. Press the EXECUTE button.

346. Verify that the RG display is XXXX 111 111 111 111. Stamp data sheet.

347. Press the WORD RATE 50 PPS indicator switch to the off (extinguished) position.

348. Press the WORD RATE 300 PPS indicator switch to the on (illuminated) position.

349. Press Keys CL, 0033.

350. Press the CHANNEL button.

351. Press the EXECUTE button.

352. Verify that the RG display is XXXX 011 111 111 111. Stamp data sheet.

353. Press the WORD RATE 300 PPS indicator switch to the off (extinguished) position.

354. Press the WORD RATE 50 PPS indicator switch to the on (illuminated) position.

Pulse Characteristics

355. Set the Oscilloscope NORMAL AND DELAYING TRIGGERING SOURCE switch to the INT position, and press the TRANSFER CONTROL indicator switch to the on (illuminated) position.

356. Press Keys CL, 0101.

357. Press the EXECUTE button.

358. Press the MONITOR indicator switch to the on (illuminated) position.

359. Set the T12 COUNTER STOP switch to the OFF position.

360. Press the PROCEED button.

361. Set the CHANNEL S switches to position 102.

362. Measure and record the pulse characteristics displayed as specified by Figure 5.

DATE ________

363. Set the CHANNEL 8 switches to position 103.

364. Measure and record the pulse characteristics displayed as specified by Figure 5.

365. Set the T12 COUNTER STOP switch to the ON position.

366. Press the WORD RATE 50 PPS indicator switch to the off (extinguished) position.

367. Press the DL ENABLE indicator switch to the off (extinguished) position.

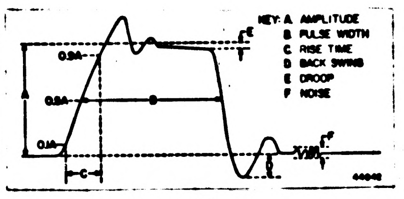

Figure 5

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC
NO. 05792
REV. ______
INITIAL TDRR 35464

JOB LINK COUNTERS TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
37	RG Indication	0000 000 000 000 111	
40	RG Indication	0000 000 000 000 111	
45	RG Indication	0000 000 000 111 000	
48	RG Indication	0000 000 000 111 000	
55	RG Indication	0000 000 000 111 000	
63	RG Indication	0000 000 000 111 000	
87	RG Indication	0000 000 000 000 111	
90	RG Indication	0000 000 000 000 111	
95	RG Indication	0000 000 000 111 000	
98	RG Indication	0000 000 000 111 000	
105	RG Indication	0000 000 000 111 000	
113	RG Indication	0000 000 000 111 000	
140	REG SEL Indication	BIT 11 is a "1"	
153	REG SEL Indication	BIT 11 is a "0"	
170	RG Indication	0000 000 000 000 000	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05792
REV. ______

JOB LINK COUNTERS TEST

Step	Parameter	Specification	Results
174	RG Indication	0000 000 000 000 000	
200	RG Indication	0000 000 000 000 000	
203	RG Indication	0000 000 000 000 000	
224	REG SEL Indication	1111 111 111 111 111	
236	REG SEL Indication	1101 010 101 010 101	
247	REG SEL Indication	0000 000 000 000 000	
281	Oscilloscope display agrees with Figure 1		
283	Oscilloscope display agrees with Figure 1		
297	Oscilloscope display agrees with Figure 2		
299	Oscilloscope display agrees with Figure 2		
316	Oscilloscope display agrees with Figure 3		
318	Oscilloscope display agrees with Figure 3		
332	Oscilloscope display agrees with Figure 4		
334	Oscilloscope display agrees with Figure 4		
346	RG Indication	XXXX 111 111 111 111	
352	RG Indication	XXXX 011 111 111 111	
362	Pulse Characteristics (X-017)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 Vp-p	

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05792
REV. ______

JOB LINK COUNTERS TEST

Step	Parameter	Specification	Results
364	Pulse Characteristics (X-085)		
	a. Amplitude (A)	6.0 ± 1.0 Volts	
	b. Pulse Width (B)	3.00 ± 0.25 μsec	
	c. Backswing (D)	NMT 40% of A	
	d. Droop (E)	NMT 15% of A	
	e. Rise Time (C)	NMT 0.2 μsec	
	f. Noise (F)	NMT 0.4 Vp-p	

DATE ______

JOB SELF-CHECK TEST PROGRAM

JDC 05794 **REV.** A **PAGE** 1 **OF** 2
INITIAL TDRR 35464 **D.S. PGS** 1

SUBSYSTEM Computer
ASSY. Block II C-Computer

DESCRIPTION

The Self-Check Test program provides an automatic check of the computer, by the computer. Self Check exercises the following computer functions: computer control pulses, special and central registers, erasable memory, fixed rope memory, arithmetic operations, and DSKY displays.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5-23-68	36249	1	-	EA.80	-

REFERENCES
JDC's 05413, 05414, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL System Test or Flight Ropes

PREPARATION

1. Verify that the Buffer Circuit Assembly, Programmer and Monitor, and Logic Drawer No. 2 panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

3. On the RDC Interface Panel, press the CH33-15 pushbutton to the on (illuminated) position. Verify that the DSKY TEMP indicator is extinguished.

4. Set the INHIBIT INCREMENTS, T12 COUNTER STOP, and INHIBIT INTERRUPT switches to the OFF position and press the PROCEED button.

5. Initialize the computer by depressing the following DSKY pushbuttons:

a. VERB 36
ENTR

6. Depress the following DSKY pushbuttons:

a.	VERB 21	NOUN 01	ENTR
b.	01362		ENTR
c.	00000		ENTR
d.			ENTR
e.	01365		ENTR
f.	00000		ENTR
g.	NOUN 15		ENTR
h.	00000		ENTR
i.			ENTR
j.	00000		ENTR
k.			ENTR
l.	00000		ENTR

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 18 JAN 68

JOB SELF-CHECK TEST PROGRAM
JDC 05794 **REV** A **PAGE** 2 **OF** 2

SUBSYSTEM Computer
ASSY Block II C-Computer

7. Initiate SELF-CHECK program by depressing the following DSKY pushbuttons:

a. VERB 21
NOUN 27
ENTR

b. 77777
ENTR

8. Monitor SELF-CHECK operation by depressing the following pushbuttons:

a. VERB 15
NOUN 01
ENTR

b. 1366
ENTR

9. Register 1 displays the contents of S Counter, location 1366. Register 1 displays will increment each time SELF-CHECK starts.

10. Register 2 displays the contents of S counter + 1, location 1367. Register 2 display will increment each time the erasable memory test of SELF-CHECK is completed.

11. Register 3 displays the contents of S counter +2, location 1370. Register 3 display will increment each time SELF-CHECK successfully completes the divided cycle.

NOTE: If the system test or flight ropes do not contain a divide test, Register 3 will display 00000.

12. If a failure occurs during SELF-CHECK, the following DSKY displays will be present:

a. Register 1 displays the SELF-CHECK error code 01102. If multiple errors occur. Register 1 displays 41102.

b. Register 2 displays the return address (contents of Register Z + 1) where the failure occurred in the program.

c. Register 3 displays the number of errors that occurred.

d. The PROG indicator is turned ON.

13. If a RESTART occurs, Registers 1, 2, and 3 will display 00000 and the RESTART indicator will be ON.

14. If a RESTART or a failure occurs during the SELF-CHECK test, discontinue further testing, and note DSKY display on data sheet.

15. Allow the SELF-CHECK program to run for approximately 10 minutes. If no errors occur terminate the program with VERB, 36, ENTR.

DATE 18 JAN 68

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05794 JDC
REV. A
INITIAL TDRR 35464

JOB SELF-CHECK TEST PROGRAM

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION
APPROVED BY ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
14.	SELF-CHECK Failure displays DSKY Registers, PROG and RESTART Indicators	Register 1 displays	____
		Register 2 displays	____
		Register 3 displays	____
		PROG Indicator on	____
		RESTART Indicator on	____

DATE 18 JAN 68

JOB SELF-CHECK TEST PROGRAM

JDC 05794 **REV.** B **PAGE** 1 **OF** 2
INITIAL TDRR 35464 **D.S. PGS** 1

SUBSYSTEM Computer
ASSY. Block II C-Computer

DESCRIPTION

The Self-Check Test program provides an automatic check of the computer, by the computer. Self Check exercises the following computer functions: computer control pulses, special and central registers, erasable memory, fixed rope memory, arithmetic operations, and DSKY displays.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5-23-68	36249	1	-	EA	-
B	8-6-68	36666	1	-	EA	-

REFERENCES
JDC's 05413, 05414, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL System Test or Flight Ropes

PREPARATION

1. Verify that the Buffer Circuit Assembly, Programmer and Monitor, and Logic Drawer No. 2 panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

3. On the RDC Interface Panel, press the CH30-15 pushbutton to the on (illuminated) position. Verify that the DSKY TEMP indicator is extinguished.

4. Set the INHIBIT INCREMENTS, T12 COUNTER STOP, and INHIBIT INTERRUPT switches to the OFF position and press the PROCEED button.

5. Initialize the computer by depressing the following DSKY pushbuttons:

a. VERB 36
ENTR

6. Depress the following DSKY pushbuttons:

a.	VERB 21	NOUN 01	ENTR
b.	01362		ENTR
c.	00000		ENTR
d.			ENTR
e.	01365		ENTR
f.	00000		ENTR
g.	NOUN 15		ENTR
h.	00000		ENTR
i.			ENTR
j.	00000		ENTR
k.			ENTR
l.	00000		ENTR

VERIFICATION WITH SIDL REQUIRED BEFORE USE

JOB SELF-CHECK TEST PROGRAM
JDC 05794 **REV** B **PAGE** 2 **OF** 2

SUBSYSTEM Computer
ASSY Block II C-Computer

7. Initiate SELF-CHECK program by depressing the following DSKY pushbuttons:

a. VERB 21
NOUN 27
ENTR

b. 77777
ENTR

8. Monitor SELF-CHECK operation by depressing the following pushbuttons:

a. VERB 15
NOUN 01
ENTR

b. 1366
ENTR

9. Register 1 displays the contents of S Counter, location 1366. Register 1 displays will increment each time SELF-CHECK starts.

10. Register 2 displays the contents of S counter + 1, location 1367. Register 2 display will increment each time the erasable memory test of SELF-CHECK is completed.

11. Register 3 displays the contents of S counter +2, location 1370. Register 3 display will increment each time SELF-CHECK successfully completes the divided cycle.

NOTE: If the system test or flight ropes do not contain a divide test, Register 3 will display 00000.

12. If a failure occurs during SELF-CHECK, the following DSKY displays will be present:

a. Register 1 displays the SELF-CHECK error code 01102. If multiple errors occur, Register 1 displays 41102.

b. Register 2 displays the return address (contents of Register Z + 1) where the failure occurred in the program.

c. Register 3 displays the number of errors that occurred.

d. The PROG indicator is turned ON.

13. If a RESTART occurs, Registers 1, 2, and 3 will display 00000 and the RESTART indicator will be ON.

14. If a RESTART or a failure occurs during the SELF-CHECK test, discontinue further testing, and note DSKY display on data sheet.

15. Allow the SELF-CHECK program to run for approximately 10 minutes. If no errors occur terminate the program with VERB, 36, ENTR.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

NO. 05794 JDC
REV. B
INITIAL TDRR 35464

JOB SELF-CHECK TEST PROGRAM

ASSEMBLY UNDER TEST

TITLE ____________

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________ SER. NO. ______ CAL DATE

NAME ____________ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION

APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
14.	SELF-CHECK Failure displays DSKY Registers, PROG and RESTART Indicators	Register 1 displays	______
		Register 2 displays	______
		Register 3 displays	______
		PROG Indicator on	______
		RESTART Indicator on	______

JOB SELF-CHECK TEST PROGRAM | **JDC** 05794 **REV.** C **PAGE** 1 **OF** 2 | **INITIAL TDRR** 35464 **D.S. PGS** 1

SUBSYSTEM Computer | **ASSY.** Block II C-Computer

DESCRIPTION

The Self-Check Test program provides an automatic check of the computer, by the computer. Self Check exercises the following computer functions: computer control pulses, special and central registers, erasable memory, fixed rope memory, arithmetic operations, and DSKY displays.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5-23-68	36249	1	-	EA	-
B	8-6-68	36666	1	-	EA	-
C	2-27-69	37378	2	-	EA	-

REFERENCES JDC's 05413, 05414, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL System Test or Flight Ropes

PREPARATION

1. Verify that the Buffer Circuit Assembly, Programmer and Monitor, and Logic Drawer No. 2 panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

3. On the RDC Interface Panel, press the CH30-15 pushbutton to the on (illuminated) position. Verify that the DSKY TEMP indicator is extinguished.

4. Set the INHIBIT INCREMENTS, T12 COUNTER STOP, and INHIBIT INTERRUPT switches to the OFF position and press the PROCEED button.

5. Initialize the computer by depressing the following DSKY pushbuttons:

a. VERB 36
ENTR

6. Depress the following DSKY pushbuttons:

a. VERB 21 NOUN 01 ENTR
b. 01362 ENTR
c. 00000 ENTR
d. ENTR
e. 01365 ENTR
f. 00000 ENTR
g. NOUN 15 ENTR
h. 00000 ENTR
i. ENTR
j. 00000 ENTR
k. ENTR
l. 00000 ENTR

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 18 JAN 68

JOB SELF-CHECK TEST PROGRAM | **JDC** 05794 **REV** C **PAGE** 2 **OF** 2

SUBSYSTEM Computer | **ASSY** Block II C-Computer

7. Initiate SELF-CHECK program by depressing the following DSKY pushbuttons:

a. VERB 21
NOUN 27
ENTR

b. 00010
ENTR

8. Monitor SELF-CHECK operation by depressing the following pushbuttons:

a. VERB 15
NOUN 01
ENTR

b. 1366
ENTR

9. Register 1 displays the contents of S Counter, location 1366. Register 1 display will increment at the start of each of the seven minor loops that make up the internal computer self check.

10. Register 2 displays the contents of S counter + 1, location 1367. Register 2 display will increment each time the erasable memory test of SELF-CHECK is completed.

11. Register 3 displays the contents of S counter +2, location 1370. Register 3 display will increment each time SELF-CHECK successfully completes the divided cycle.

NOTE: If the system test or flight ropes do not contain a divide test, Register 3 will display 00000.

12. If a failure occurs during SELF-CHECK, the following DSKY displays will be present:

a. Register 1 displays the SELF-CHECK error code 01102. If multiple errors occur. Register 1 displays 41102.

b. Register 2 displays the return address (contents of Register Z + 1) where the failure occurred in the program.

c. Register 3 displays the number of errors that occurred.

d. The PROG indicator is turned ON.

13. If a RESTART occurs, Registers 1, 2, and 3 will display 00000 and the RESTART indicator will be ON.

14. If a RESTART or a failure occurs during the SELF-CHECK test, discontinue further testing, and note DSKY display on data sheet.

15. Allow the SELF-CHECK program to run for approximately 10 minutes. If no errors occur terminate the program with VERB, 36, ENTR.

DATE 18 JAN 68

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

NO. 05794 JDC
REV. C
INITIAL TDRR 35464

JOB SELF-CHECK TEST PROGRAM

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION   APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
14.	SELF-CHECK Failure displays DSKY Registers, PROG and RESTART Indicators	Register 1 displays	______
		Register 2 displays	______
		Register 3 displays	______
		PROG Indicator on	______
		RESTART Indicator on	______

DATE 18 JAN 68

JOB SELF-CHECK TEST PROGRAM

JDC 05794 REV. ____ PAGE 1 OF 2
INITIAL TDRR 35464 D.S. PGS 1

SUBSYSTEM Computer

ASSY. Block II C-Computer

DESCRIPTION

The Self-Check Test program provides an automatic check of the computer, by the computer. Self Check exercises the following computer functions: computer control pulses, special and central registers, erasable memory, fixed rope memory, arithmetic operations, and DSKY displays.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
JDC's 05413, 05414, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL System Test or Flight Ropes

PREPARATION

1. Verify that the Buffer Circuit Assembly, Programmer and Monitor, and Logic Drawer No. 2 panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

3. On the RDC Interface Panel, press the CH33-15 pushbutton to the on (illuminated) position. Verify that the DSKY TEMP indicator is extinguished.

4. Set the INHIBIT INCREMENTS, T12 COUNTER STOP, and INHIBIT INTERRUPT switches to the OFF position and press the PROCEED button.

5. Initialize the computer by depressing the following DSKY pushbuttons:

a. VERB 36
ENTR

6. Zero erasable memory by depressing the following DSKY pushbuttons:

a. VERB 57
ENTR

b. 15
ENTR

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB SELF-CHECK TEST PROGRAM

JDC 05794 REV PAGE 2 OF 2

SUBSYSTEM Computer

ASSY Block II C-Computer

7. Initiate SELF-CHECK program by depressing the following DSKY pushbuttons:

a. VERB 21
NOUN 27
ENTR

b. 77777
ENTR

8. Monitor SELF-CHECK operation by depressing the following pushbuttons:

a. VERB 15
NOUN 01
ENTR

b. 1366
ENTR

9. Register 1 displays the contents of S Counter, location 1366. Register 1 displays will increment each time SELF-CHECK starts.

10. Register 2 displays the contents of S counter + 1, location 1367. Register 2 display will increment each time the erasable memory test of SELF-CHECK is completed.

11. Register 3 displays the contents of S counter +2, location 1370. Register 3 display will increment each time SELF-CHECK successfully completes the divided cycle.

NOTE: If the system test or flight ropes do not contain a divide test, Register 3 will display 00000.

12. If a failure occurs during SELF-CHECK, the following DSKY displays will be present:

a. Register 1 displays the SELF-CHECK error code 01102. If multiple errors occur, Register 1 displays 41102.

b. Register 2 displays the return address (contents of Register Z + 1) where the failure occurred in the program.

c. Register 3 displays the number of errors that occurred.

d. The PROG indicator is turned ON.

13. If a RESTART occurs, Registers 1, 2, and 3 will display 00000 and the RESTART indicator will be ON.

14. If a RESTART or a failure occurs during the SELF-CHECK test, discontinue further testing, and note DSKY display on data sheet.

15. Allow the SELF-CHECK program to run for approximately 10 minutes. If no errors occur terminate the program with VERB, 36, ENTR.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05794 JDC
REV. ______
INITIAL TDRR 35464

JOB SELF-CHECK TEST PROGRAM

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ ______ CAL DATE
NAME ______ SER. NO. ______ ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
14.	SELF-CHECK Failure displays DSKY Registers, PROG and RESTART Indicators	Register 1 displays	______
		Register 2 displays	______
		Register 3 displays	______
		PROG Indicator on	______
		RESTART Indicator on	______

DATE ______

JOB VOLTAGE MARGINS TEST

JDC 05795 **REV.** A **PAGE** 1 **OF** 3
INITIAL TDRR 35464 **D.S. PGS** 1

SUBSYSTEM Computer
ASSY. Block II C-Computer

DESCRIPTION

Utilizes the Self-Check Test Program to exercise computer functions with the +4 volt and +14 volt supplies set to marginal and nominal levels.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	10-17-68	36913	3	-	EA	-

REFERENCES
JDC's 05413, 05414, 05794, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Buffer circuit assembly, Programmer and Monitor, and Logic Drawer No. 2 panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

CH 30 3. On the RDC Interface Panel, press the CH30-15 pushbutton to the on (illuminated) position. Verify that the DSKY TEMP indicator is extinguished.

4. On the Programmer and Monitor panel, press the MONITOR indicator switch to the on (illuminated) position.

NOTE: Unless specified otherwise, all controls and indicators referenced in the remainder of this procedure are located on the Operation Console and the Power Control panel of the CTS.

5. Set the VOLTAGE SELECT switch to METER ZERO and using the METER ZERO potentiometer adjust for 00.00V.

6. Set the DCVM MONITOR switch to the ZERO position and with DCVM ZERO potentiometer adjust for 00.00V.

7. Set the DCVM MONITOR switch to the AGC-28VA position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 18 JAN 68

JOB VOLTAGE MARGINS TEST
JDC 05795 **REV** A **PAGE** 2 **OF** 3

SUBSYSTEM Computer
ASSY Block II C-Computer

8. Adjust the UNIVERSAL DSKY DIMMERS for sufficient intensity of the DSKY Alarm and display indicators.

9. On the RDC INTERFACE panel, press the INHIBIT PWR FAIL indicator switch to the on (illuminated) position.

10. Set the AGC MARGINS switch to the NORM position.

11. Set the VOLTAGE SELECT switch to (+4V) +3V position.

12. Set the CONTROL 1 and CONTROL 2 potentiometers to the 1 and 2 positions, respectively.

13. Turn AGC VOLTAGE CONTROL 1 switch to ON.

14. Adjust the CONTROL 1 potentiometer for a voltage of 4.00 ± 0.01 VDC.

15. Set the VOLTAGE SELECT switch to (+14V) +13V position.

16. Turn AGC VOLTAGE CONTROL 2 switch to ON.

17. Adjust the CONTROL 2 potentiometer for a voltage of 14.00 ± 0.01 VDC.

18. Perform the Self-Check Test Program, JDC 05794.

19. Allow the program to run for 30 minutes. Verify that no failures occurred. Record on data sheet.

LOW +4V AND LOW +14V MARGINAL TEST

20. Set the VOLTAGE SELECT switch to the (+4V) +3V position.

21. With the CONTROL 1 potentiometer, slowly lower the voltage to 3.40 ± 0.01 VDC.

22. Set the VOLTAGE SELECT switch to the (+14V) +13V position.

23. With the CONTROL 2 potentiometer, slowly lower the voltage to 12.10 ± 0.01 VDC.

24. Allow the program to run for another 30 minutes and verify no failures occur. Record on data sheet.

LOW +4V AND HIGH +14V MARGINAL TEST

25. With the CONTROL 2 potentiometer, slowly increase the voltage to 16.40 ± 0.01 VDC.

26. Allow the program to run for another 30 minutes and verify no failures occur. Record on data sheet.

HIGH +4V AND LOW +14V MARGINAL TEST

27. With the CONTROL 2 potentiometer, slowly lower the voltage to 12.10 ± 0.01 VDC.

28. Set the VOLTAGE SELECT switch to the (+4V) +3V position.

29. With the CONTROL 1 potentiometer, slowly increase the voltage to 4.6 ± 0.01 VDC.

30. Allow the program to run for another 30 minutes, and verify no failures occur. Record on data sheet.

HIGH +4V AND HIGH +14V MARGINAL TEST

31. Set the VOLTAGE SELECT switch to the (+14V) +13V position.

32. With the CONTROL 2 potentiometer, slowly increase the voltage to 16.40 ± 0.01 VDC.

33. Allow the program to run for another 30 minutes and verify no failures occur. Record on data sheet.

DATE 18 JAN 68

JOB VOLTAGE MARGINS TEST
JDC 05795 **REV** A **PAGE** 3 **OF** 3

SUBSYSTEM Computer
ASSY Block II C-Computer

NOMINAL ADJUSTMENT

34. Set the AGC VOLTAGE CONTROL 1 switch to the OFF position.

35. Set the AGC VOLTAGE CONTROL 2 switch to the OFF position.

36. Set the CONTROL 1 potentiometer to the 1 position.

37. Set the CONTROL 2 potentiometer to the 2 position.

38. Set the AGC MARGINS switch to the OSC position.

39. Allow the program to run for another 30 minutes and verify no failures occur. Record on data sheet.

40. Set the AGC MARGINS switch to the NORM position.

41. On the RDC Interface panel, press the INHIBIT PWR FAIL indicator switch to the off (extinguished) position.

DATE 18 JAN 68

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EQUIPMENT TEST
DATA SHEET 1 **OF** 1

NO. 05795 JDC
REV. A
INITIAL TDRR 35464

JOB VOLTAGE MARGINS TEST

ASSEMBLY UNDER TEST

TITLE ________
SER. NO. ____ **DWG** ____ **REV.** ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ **SER. NO.** ____ CAL DATE
NAME ________ **SER. NO.** ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION **APPROVED BY** ____ NAME/AFFILIATION

Step	Parameter	Specification	Results
19.	+4 vdc and +14 vdc - Nominal	No Self-Check Failures	
24.	Low +4 vdc, Low +14 vdc	No Self-Check Failures	
26.	Low +4 vdc, High +14 vdc	No Self-Check Failures	
30.	High +4 vdc, Low +14 vdc	No Self-Check Failures	
33.	High +4 vdc, High +14 vdc	No Self-Check Failures	
39.	+4 vdc and +14 vdc - Nominal	No Self-Check Failures	

DATE 18 JAN 68

	JDC 05795 **REV.** B **PAGE** 1 **OF** 3
JOB VOLTAGE MARGINS TEST	**INITIAL TDRR** 35464 **D.S. PGS** 1
SUBSYSTEM Computer	**ASSY.** Block II C-Computer

DESCRIPTION

Utilizes the Self-Check Test Program to exercise computer functions with the +4 volt and +14 volt supplies set to marginal and nominal levels.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	10-17-68	36913	3	-	EA	-
B	12-20-71	38550	2, 3	-	EA	-

REFERENCES

JDC's 05413, 05414, 05794, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Buffer circuit assembly, Programmer and Monitor, and Logic Drawer No. 2 panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

3. On the RDC Interface Panel, press the CH30-15 pushbutton to the on (illuminated) position. Verify that the DSKY TEMP indicator is extinguished.

4. On the Programmer and Monitor panel, press the MONITOR indicator switch to the on (illuminated) position.

NOTE: Unless specified otherwise, all controls and indicators referenced in the remainder of this procedure are located on the Operation Console and the Power Control panel of the CTS.

5. Set the VOLTAGE SELECT switch to METER ZERO and using the METER ZERO potentiometer adjust for 00.00V.

6. Set the DCVM MONITOR switch to the ZERO position and with DCVM ZERO potentiometer adjust for 00.00V.

7. Set the DCVM MONITOR switch to the AGC-28VA position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 18 JAN 68

JOB VOLTAGE MARGINS TEST	**JDC** 05795 **REV** B **PAGE** 2 **OF** 3
SUBSYSTEM Computer	**ASSY** Block II C-Computer

8. Adjust the UNIVERSAL DSKY DIMMERS for sufficient intensity of the DSKY Alarm and display indicators.

9. On the RDC INTERFACE panel, press the INHIBIT PWR FAIL indicator switch to the on (illuminated) position.

10. Set the AGC MARGINS switch to the NORM position.

11. Set the VOLTAGE SELECT switch to (+4V) +3V position.

12. Set the CONTROL 1 and CONTROL 2 potentiometers to the 1 and 2 positions, respectively.

13. Turn AGC VOLTAGE CONTROL 1 switch to ON.

14. Adjust the CONTROL 1 potentiometer for a voltage of 4.00 ± 0.01 VDC.

15. Set the VOLTAGE SELECT switch to (+14V) +13V position.

16. Turn AGC VOLTAGE CONTROL 2 switch to ON.

17. Adjust the CONTROL 2 potentiometer for a voltage of 14.00 ± 0.01 VDC.

18. Perform steps 1 through 14 of the Self-Check Test Program, JDC 05794.

19. Allow the program to run for 30 minutes. Verify that no failures occurred. Record on data sheet.

LOW +4V AND LOW +14V MARGINAL TEST

20. Set the VOLTAGE SELECT switch to the (+4V) +3V position.

21. With the CONTROL 1 potentiometer, slowly lower the voltage to 3.40 ± 0.01 VDC.

22. Set the VOLTAGE SELECT switch to the (+14V) +13V position.

23. With the CONTROL 2 potentiometer, slowly lower the voltage to 12.10 ± 0.01 VDC.

24. Allow the program to run for another 30 minutes and verify no failures occur. Record on data sheet.

LOW +4V AND HIGH +14V MARGINAL TEST

25. With the CONTROL 2 potentiometer, slowly increase the voltage to 16.40 ± 0.01 VDC.

26. Allow the program to run for another 30 minutes and verify no failures occur. Record on data sheet.

HIGH +4V AND LOW +14V MARGINAL TEST

27. With the CONTROL 2 potentiometer, slowly lower the voltage to 12.10 ± 0.01 VDC.

28. Set the VOLTAGE SELECT switch to the (+4V) +3V position.

29. With the CONTROL 1 potentiometer, slowly increase the voltage to 4.6 ± 0.01 VDC.

30. Allow the program to run for another 30 minutes, and verify no failures occur. Record on data sheet.

HIGH +4V AND HIGH +14V MARGINAL TEST

31. Set the VOLTAGE SELECT switch to the (+14V) +13V position.

32. With the CONTROL 2 potentiometer, slowly increase the voltage to 16.40 ± 0.01 VDC.

33. Allow the program to run for another 30 minutes and verify no failures occur. Record on data sheet.

DATE 18 JAN 68

JOB VOLTAGE MARGINS TEST	**JDC** 05795 **REV** B **PAGE** 3 **OF** 3
SUBSYSTEM Computer	**ASSY** Block II C-Computer

NOMINAL ADJUSTMENT

34. Set the AGC VOLTAGE CONTROL 1 switch to the OFF position.

35. Set the AGC VOLTAGE CONTROL 2 switch to the OFF position.

36. Set the CONTROL 1 potentiometer to the 1 position.

37. Set the CONTROL 2 potentiometer to the 2 position.

38. Set the AGC MARGINS switch to the OSC position.

39. Allow the program to run for another 30 minutes and verify no failures occur. Record on data sheet.

40. Set the AGC MARGINS switch to the NORM position.

41. On the RDC Interface panel, press the INHIBIT PWR FAIL indicator switch to the off (extinguished) position.

42. Depress the following DSKY push-buttons:

VERB 36
ENTR

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

NO. 05795 JDC
REV. B
INITIAL TDRR 35464

JOB VOLTAGE MARGINS TEST

ASSEMBLY UNDER TEST	TEST HISTORY
TITLE ________	DATE ____ START ____ END ____ SITE / LOCATION
SER. NO. ____ DWG ____ REV. ____	TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ____ CAL DATE
NAME ________ SER. NO. ____ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

Step	Parameter	Specification	Results
19.	+4 vdc and +14 vdc - Nominal	No Self-Check Failures	
24.	Low +4 vdc, Low +14 vdc	No Self-Check Failures	
26.	Low +4 vdc, High +14 vdc	No Self-Check Failures	
30.	High +4 vdc, Low +14 vdc	No Self-Check Failures	
33.	High +4 vdc, High +14 vdc	No Self-Check Failures	
39.	+4 vdc and +14 vdc - Nominal	No Self-Check Failures	

DATE 18 JAN 68

JOB VOLTAGE MARGINS TEST
JDC 05795 REV. ___ PAGE 1 OF 3
INITIAL TDRR 35464 D.S. PGS 1
SUBSYSTEM Computer
ASSY. Block II C-Computer

DESCRIPTION

Utilizes the Self-Check Test Program to exercise computer functions with the +4 volt and +14 volt supplies set to marginal and nominal levels.

Rev. Ltr.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA

REFERENCES JDC's 05413, 05414, 05794, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL As required

TOOLS AND MATERIAL

PREPARATION

1. Verify that the Buffer circuit assembly, Programmer and Monitor, and Logic Drawer No. 2 panels are set-up as specified in JDC 05413.

2. Verify that the XY and RDC Interface Panels are set up as specified in JDC 05414.

3. On the RDC Interface Panel, press the CH30-15 pushbutton to the on (illuminated) position. Verify that the DSKY TEMP indicator is extinguished.

4. On the Programmer and Monitor panel, press the MONITOR indicator switch to the on (illuminated) position.

NOTE: Unless specified otherwise, all controls and indicators referenced in the remainder of this procedure are located on the Operation Console and the Power Control panel of the CTS.

5. Set the VOLTAGE SELECT switch to METER ZERO and using the METER ZERO potentiometer adjust for 00.00V.

6. Set the DCVM MONITOR switch to the ZERO position and with DCVM ZERO potentiometer adjust for 00.00V.

7. Set the DCVM MONITOR switch to the AGC-28VA position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB VOLTAGE MARGINS TEST
JDC 05795 REV PAGE 2 OF 3
SUBSYSTEM Computer
ASSY Block II C-Computer

8. Adjust the UNIVERSAL DSKY DIMMERS for sufficient intensity of the DSKY Alarm and display indicators.

9. On the RDC INTERFACE panel, press the INHIBIT PWR FAIL indicator switch to the on (illuminated) position.

10. Set the AGC MARGINS switch to the NORM position.

11. Set the VOLTAGE SELECT switch to (+4V) +3V position.

12. Set the CONTROL 1 and CONTROL 2 potentiometers to the 1 and 2 positions, respectively.

13. Turn AGC VOLTAGE CONTROL 1 switch to ON.

14. Adjust the CONTROL 1 potentiometer for a voltage of 4.00 ± 0.01 VDC.

15. Set the VOLTAGE SELECT switch to (+14V) +13V position.

16. Turn AGC VOLTAGE CONTROL 2 switch to ON.

17. Adjust the CONTROL 2 potentiometer for a voltage of 14.00 ± 0.01 VDC.

18. Perform the Self-Check Test Program, JDC 05794.

19. Allow the program to run for 30 minutes. Verify that no failures occurred. Record on data sheet.

LOW +4V AND LOW +14V MARGINAL TEST

20. Set the VOLTAGE SELECT switch to the (+4V) +3V position.

21. With the CONTROL 1 potentiometer, slowly lower the voltage to 3.40 ± 0.01 VDC.

22. Set the VOLTAGE SELECT switch to the (+14V) +13V position.

23. With the CONTROL 2 potentiometer, slowly lower the voltage to 12.10 ± 0.01 VDC.

24. Allow the program to run for another 30 minutes and verify no failures occur. Record on data sheet.

LOW +4V AND HIGH +14V MARGINAL TEST

25. With the CONTROL 2 potentiometer, slowly increase the voltage to 16.40 ± 0.01 VDC.

26. Allow the program to run for another 30 minutes and verify no failures occur. Record on data sheet.

HIGH +4V AND LOW +14V MARGINAL TEST

27. With the CONTROL 2 potentiometer, slowly lower the voltage to 12.10 ± 0.01 VDC.

28. Set the VOLTAGE SELECT switch to the (+4V) +3V position.

29. With the CONTROL 1 potentiometer, slowly increase the voltage to 4.6 ± 0.01 VDC.

30. Allow the program to run for another 30 minutes, and verify no failures occur. Record on data sheet.

HIGH +4V AND HIGH +14V MARGINAL TEST

31. Set the VOLTAGE SELECT switch to the (+14V) +13V position.

32. With the CONTROL 2 potentiometer, slowly increase the voltage to 16.40 ± 0.01 VDC.

33. Allow the program to run for another 30 minutes and verify no failures occur. Record on data sheet.

DATE ______

JOB VOLTAGE MARGINS TEST
JDC 05795 REV PAGE 3 OF 3
SUBSYSTEM Computer
ASSY Block II C-Computer

NOMINAL ADJUSTMENT

34. Set the AGC VOLTAGE CONTROL 1 switch to the OFF position.

35. Set the AGC VOLTAGE CONTROL 2 switch to the OFF position.

36. Set the CONTROL 1 potentiometer to the 1 position.

37. Set the CONTROL 2 potentiometer to the 2 position.

38. Set the AGC MARGINS switch to the OSC position.

39. Allow the program to run for another 30 minutes and verify no failures occur. Record on data sheet.

40. Set the AGC MARGINS switch to the NORM position.

41. On the RDC Interface panel, press the INHIBIT PWR FAIL indicator switch to the on (illuminated) position.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

NO. 05795 JDC
REV. ______
INITIAL TDRR 35464

JOB VOLTAGE MARGINS TEST

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

Step	Parameter	Specification	Results
19.	+4 vdc and +14 vdc - Nominal	No Self-Check Failures	
24.	Low +4 vdc, Low +14 vdc	No Self-Check Failures	
26.	Low +4 vdc, High +14 vdc	No Self-Check Failures	
30.	High +4 vdc, Low +14 vdc	No Self-Check Failures	
33.	High +4 vdc, High +14 vdc	No Self-Check Failures	
39.	+4 vdc and +14 vdc - Nominal	No Self-Check Failures	

DATE ______

JOB MAIN DSKY KEY TEST

JDC 05796 **REV.** - **PAGE** 1 **OF** 4
INITIAL TDRR 35464 **D.S. PGS** 3

SUBSYSTEM Computer

ASSY. Block II C-Computer

DESCRIPTION

Exercises keys 0 through 9, +, −, VERB, NOUN, CLR, KEY REL, ENTER, RSET. Tests the operation of the RSET and STBY key functions.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA

REFERENCES
JDC 05413, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL
As required

TOOLS AND MATERIAL
System Test or Flight Ropes

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel and the Logic Drawer No. 2 panel of the CTS.

OPERATION

2. Press the READ AGC indicator switch to the on (illuminated) position.

3. Press Keys CL, 0015

4. Verify that the RZ display is 0000 000 000 001 101.

5. Press the CHANNEL button.

6. Press the EXECUTE button.

7. Verify that the OINC indicator is on.

8. Press the FORCED READ indicator switch to the on (illuminated) position.

9. Set the T12 COUNTER STOP switch to the OFF position.

10. Press the PROCEED button.

11. Verify that the OINC indicator is on.

12. Verify that the STPIT indicator is off.

13. Continuously press the DSKY VERB Key and verify that the REG SEL display is 0000 000 000 010 001. Stamp data sheet.

14. Release the DSKY VERB Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB MAIN DSKY KEY TEST

JDC 05796 **REV** - **PAGE** 2 **OF** 4

SUBSYSTEM Computer

ASSY Block II C-Computer

15. Continuously press the DSKY NOUN Key and verify that the REG SEL display is 0000 000 000 011 111. Stamp data sheet.

16. Release the DSKY NOUN Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

17. Continuously press the DSKY + Key and verify that the REG SEL display is 0000 000 000 011 010. Stamp data sheet.

18. Release the DSKY + Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

19. Continuously press the DSKY − Key and verify that the REG SEL display is 0000 000 000 011 011. Stamp data sheet.

20. Release the DSKY − Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

21. Continuously press the DSKY 0 Key and verify that the REG SEL display is 0000 000 000 010 000. Stamp data sheet.

22. Release the DSKY 0 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

23. Continuously press the DSKY 7 Key and verify that the REG SEL display is 0000 000 000 000 111. Stamp data sheet.

24. Release the DSKY 7 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

25. Continuously press the DSKY 4 Key and verify that the REG SEL display is 0000 000 000 000 100. Stamp data sheet.

26. Release the DSKY 4 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

27. Continuously press the DSKY 1 Key and verify that the REG SEL display is 0000 000 000 000 001. Stamp data sheet.

28. Release the DSKY 1 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

29. Continuously press the DSKY 8 Key and verify that the REG SEL display is 0000 000 000 001 000. Stamp data sheet.

30. Release the DSKY 8 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

31. Continuously press the DSKY 5 Key and verify that the REG SEL display is 0000 000 000 000 101. Stamp data sheet.

32. Release the DSKY 5 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

33. Continuously press the DSKY 2 Key and verify that the REG SEL display is 0000 000 000 000 010. Stamp data sheet.

34. Release the DSKY 2 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

35. Continuously press the DSKY 9 Key and verify that the REG SEL display is 0000 000 000 001 001. Stamp data sheet.

36. Release the DSKY 9 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

DATE ______

JOB MAIN DSKY KEY TEST

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SUBSYSTEM Computer

ASSY Block II C-Computer

37. Continuously press the DSKY 6 Key and verify that the REG SEL display is 0000 000 000 000 110. Stamp data sheet.

38. Release the DSKY 6 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

39. Continuously press the DSKY 3 Key and verify that the REG SEL display is 0000 000 000 000 011. Stamp data sheet.

40. Release the DSKY 3 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

41. Continuously press the DSKY CLR Key and verify that the REG SEL display is 0000 000 000 011 110. Stamp data sheet.

42. Release the DSKY CLR Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

43. Continuously press the DSKY KEY REL Key and verify that the REG SEL display is 0000 000 000 011 001. Stamp data sheet.

44. Release the DSKY KEY REL Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

45. Continuously press the DSKY ENTER Key and verify that the REG SEL display is 0000 000 000 011 100. Stamp data sheet.

46. Release the DSKY ENTER Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

47. Continuously press the DSKY RSET Key and verify that the REG SEL display is 0000 000 000 010 010. Stamp data sheet.

48. Release the DSKY RSET Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

49. Press the MONITOR indicator switch to the on (illuminated) position.

50. Press the FORCED READ switch to the off position.

51. Set the INHIBIT INTERRUPT and INHIBIT INCREMENTS switches to the off position.

52. Press the FRESH START button.

53. Press the PROCEED button.

54. Verify that the DSKY RESTART indicator is on.

55. Press the DSKY RSET Key.

56. Verify that the DSKY RESTART indicator is extinguished. Stamp data sheet.

57. Press the DSKY VERB Key.

58. Press DSKY Keys 60.

59. Press the DSKY ENTR Key.

60. Hold down the DSKY STBY Key until the STBY indicator illuminates and time the interval. (Indicator should illuminate within 2.00 seconds after the STBY Key has been depressed.) Record time on data sheet.

61. Hold down the DSKY STBY Key for the interval recorded in step 60 above.

DATE ______

JOB MAIN DSKY KEY TEST

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SUBSYSTEM Computer

ASSY Block II C-Computer

62. Press the FRESH START and PROCEED buttons.

63. Press the DSKY RSET Key.

64. Press the DSKY VERB Key.

65. Press DSKY Key 36.

66. Press the DSKY ENTR Key.

DATE ______

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EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC
NO. 05796
REV. ___
INITIAL TDRR 35464

JOB MAIN DSKY KEY TEST

ASSEMBLY UNDER TEST

TITLE ________
SER. NO. ________ DWG ________ REV. ________

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ CAL DATE
NAME ________ SER. NO. ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

Step	Parameter	Specification	Results
13.	REG SEL Indication	0000 000 000 010 001	
14.	REG SEL Indication	0000 000 000 000 000	
15.	REG SEL Indication	0000 000 000 011 111	
16.	REG SEL Indication	0000 000 000 000 000	
17.	REG SEL Indication	0000 000 000 011 010	
18.	REG SEL Indication	0000 000 000 000 000	
19.	REG SEL Indication	0000 000 000 011 011	
20.	REG SEL Indication	0000 000 000 000 000	
21.	REG SEL Indication	0000 000 000 010 000	
22.	REG SEL Indication	0000 000 000 000 000	
23.	REG SEL Indication	0000 000 000 000 111	
24.	REG SEL Indication	0000 000 000 000 000	
25.	REG SEL Indication	0000 000 000 000 100	
26.	REG SEL Indication	0000 000 000 000 000	
27.	REG SEL Indication	0000 000 000 000 001	

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05796
REV. -

JOB MAIN DSKY KEY TEST

Step	Parameter	Specification	Results
28.	REG SEL Indication	0000 000 000 000 000	
29.	REG SEL Indication	0000 000 000 001 000	
30.	REG SEL Indication	0000 000 000 000 000	
31.	REG SEL Indication	0000 000 000 000 101	
32.	REG SEL Indication	0000 000 000 000 000	
33.	REG SEL Indication	0000 000 000 000 010	
34.	REG SEL Indication	0000 000 000 000 000	
35.	REG SEL Indication	0000 000 000 001 001	
36.	REG SEL Indication	0000 000 000 000 000	
37.	REG SEL Indication	0000 000 000 000 110	
38.	REG SEL Indication	0000 000 000 000 000	
39.	REG SEL Indication	0000 000 000 000 011	
40.	REG SEL Indication	0000 000 000 000 000	
41.	REG SEL Indication	0000 000 000 011 110	
42.	REG SEL Indication	0000 000 000 000 000	
43.	REG SEL Indication	0000 000 000 011 001	
44.	REG SEL Indication	0000 000 000 000 000	
45.	REG SEL Indication	0000 000 000 011 100	
46.	REG SEL Indication	0000 000 000 000 000	
47.	REG SEL Indication	0000 000 000 010 010	
48.	REG SEL Indication	0000 000 000 000 000	

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05796
REV. ________

JOB MAIN DSKY KEY TEST

Step	Parameter	Specification	Results
56	DSKY RESTART indicator is extinguished		
60	DSKY STBY Indicator illuminates after STBY Key is depressed		

DATE ________

JDC 05797 REV. - PAGE 1 OF 4
INITIAL TDRR 35464 D.S. PGS 3

JOB NAVIGATION DSKY KEY TEST

SUBSYSTEM Computer

ASSY. Block II C-Computer

DESCRIPTION

Exercises keys 0 through 9, +, −, VERB, NOUN, CLR, KEY REL, ENTER, RSET. Tests the operation of the RSET and STBY key functions.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES JDC's 05413, 05414, ND-1021042, and ND-1021043

IMPORTANT

INTERVAL At required

TOOLS AND MATERIAL System Test or Flight Ropes

PREPARATION

1. Perform the Programmer and Monitor and Logic Drawer No. 2 Panel Preliminary Test Set-Up Procedure, JDC 05413.

NOTE: Unless specified otherwise, all controls and indicators referenced in this procedure are on the Programmer and Monitor panel and the Logic Drawer No. 2 panel of the CTS.

OPERATION

2. Press the READ AGC indicator switch to the on (illuminated) position.

3. Press Keys CL, 0016.

4. Verify that the RZ display is 0000 000 000 001 110.

5. Press the CHANNEL button.

6. Press the EXECUTE button.

7. Verify that the OINC indicator is on.

8. Press the FORCED READ indicator switch to the on (illuminated) position.

9. Set the T12 COUNTER STOP switch to the OFF position.

10. Press the PROCEED button.

11. Verify that the OINC indicator is on.

12. Verify that the STPIT indicator is off.

13. Continuously press the DSKY VERB Key and verify that the REG SEL display is 0000 000 000 010 001. Stamp data sheet.

14. Release the DSKY VERB Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB NAVIGATION DSKY KEY TEST
JDC 05797 REV - PAGE 2 OF 4

SUBSYSTEM Computer
ASSY Block II C-Computer

15. Continuously press the DSKY NOUN Key and verify that the REG SEL display is 0000 000 000 011 111. Stamp data sheet.

16. Release the DSKY NOUN Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

17. Continuously press the DSKY + Key and verify that the REG SEL display is 0000 000 000 011 010. Stamp data sheet.

18. Release the DSKY + Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

19. Continuously press the DSKY − Key and verify that the REG SEL display is 0000 000 000 011 011. Stamp data sheet.

20. Release the DSKY − Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

21. Continuously press the DSKY 0 Key and verify that the REG SEL display is 0000 000 000 010 000. Stamp data sheet.

22. Release the DSKY 0 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

23. Continuously press the DSKY 7 Key and verify that the REG SEL display is 0000 000 000 000 111. Stamp data sheet.

24. Release the DSKY 7 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

25. Continuously press the DSKY 4 Key and verify that the REG SEL display is 0000 000 000 000 100. Stamp data sheet.

26. Release the DSKY 4 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

27. Continuously press the DSKY 1 Key and verify that the REG SEL display is 0000 000 000 000 001. Stamp data sheet.

28. Release the DSKY 1 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

29. Continuously press the DSKY 8 Key and verify that the REG SEL display is 0000 000 000 001 000. Stamp data sheet.

30. Release the DSKY 8 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

31. Continuously press the DSKY 5 Key and verify that the REG SEL display is 0000 000 000 000 101. Stamp data sheet.

32. Release the DSKY 5 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

33. Continuously press the DSKY 2 Key and verify that the REG SEL display is 0000 000 000 000 010. Stamp data sheet.

34. Release the DSKY 2 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

35. Continuously press the DSKY 9 Key and verify that the REG SEL display is 0000 000 000 001 001. Stamp data sheet.

DATE ______

JOB NAVIGATION DSKY KEY TEST
JDC 05797 REV - PAGE 3 OF 4

SUBSYSTEM Computer
ASSY Block II C-Computer

36. Release the DSKY 9 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

37. Continuously press the DSKY 6 Key and verify that the REG SEL display is 0000 000 000 000 110. Stamp data sheet.

38. Release the DSKY 6 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

39. Continuously press the DSKY 3 Key and verify that the REG SEL display is 0000 000 000 000 011. Stamp data sheet

40. Release the DSKY 3 Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

41. Continuously press the DSKY CLR Key and verify that the REG SEL display is 0000 000 000 011 110. Stamp data sheet.

42. Release the DSKY CLR Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

43. Continuously press the DSKY KEY REL Key and verify that the REG SEL display is 0000 000 000 011 001. Stamp data sheet.

44. Release the DSKY KEY REL Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

45. Continuously press the DSKY ENTER Key and verify that the REG SEL display is 0000 000 000 011 100. Stamp data sheet.

46. Release the DSKY ENTER Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

47. Continuously press the DSKY RSET Key and verify that the REG SEL display is 0000 000 000 010 010. Stamp data sheet.

48. Release the DSKY RSET Key and verify that the REG SEL display is 0000 000 000 000 000. Stamp data sheet.

49. Press the MONITOR indicator switch to the on (illuminated) position.

50. Press the FORCED READ switch to the off position.

51. Set the INHIBIT INTERRUPT and INHIBIT INCREMENT switches to the OFF position.

52. Press the FRESH START button.

53. Press the PROCEED button.

54. Verify that the DSKY RESTART indicator is on.

55. Press the DSKY RSET Key.

56. Verify that the DSKY RESTART indicator is extinguished. Stamp data sheet.

57. Press the DSKY VERB Key.

58. Press DSKY Keys 60.

59. Press the DSKY ENTR Key.

60. Hold down the DSKY STBY Key until the STBY indicator illuminates and time the interval. (Indicator should illuminate within 2. 00 seconds after the STBY Key has been depressed.) Record time on data sheet.

61. Hold down the DSKY STBY Key for the interval recorded in step 60 above.

DATE ______

JOB NAVIGATION DSKY KEY TEST
JDC 05797 REV - PAGE 4 OF 4

SUBSYSTEM Computer
ASSY Block II C-Computer

62. Press the FRESH START and PROCEED buttons.

63. Press the DSKY RSET key.

64. Press the DSKY VERB key.

65. Press DSKY key 36.

66. Press the DSKY ENTR key.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC
NO. 05797
REV. -
INITIAL TDRR 35464

JOB NAVIGATION DSKY KEY TEST

ASSEMBLY UNDER TEST
TITLE
SER. NO. DWG REV.

TEST HISTORY
DATE START END SITE / LOCATION
TIME START END TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME SER. NO. CAL DATE
NAME SER. NO. CAL DATE

CONDUCTED BY NAME/AFFILIATION APPROVED BY NAME/AFFILIATION

Step	Parameter	Specification	Results
13.	REG SEL Indication	0000 000 000 010 001	
14.	REG SEL Indication	0000 000 000 000 000	
15.	REG SEL Indication	0000 000 000 011 111	
16.	REG SEL Indication	0000 000 000 000 000	
17.	REG SEL Indication	0000 000 000 011 010	
18.	REG SEL Indication	0000 000 000 000 000	
19.	REG SEL Indication	0000 000 000 011 011	
20.	REG SEL Indication	0000 000 000 000 000	
21.	REG SEL Indication	0000 000 000 010 000	
22.	REG SEL Indication	0000 000 000 000 000	
23.	REG SEL Indication	0000 000 000 000 111	
24.	REG SEL Indication	0000 000 000 000 000	
25.	REG SEL Indication	0000 000 000 000 100	
26.	REG SEL Indication	0000 000 000 000 000	

DATE

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 05797
REV. -

JOB NAVIGATION DSKY KEY TEST

Step	Parameter	Specification	Results
27.	REG SEL Indication	0000 000 000 000 001	
28.	REG SEL Indication	0000 000 000 000 000	
29.	REG SEL Indication	0000 000 000 001 000	
30.	REG SEL Indication	0000 000 000 000 000	
31.	REG SEL Indication	0000 000 000 000 101	
32.	REG SEL Indication	0000 000 000 000 000	
33.	REG SEL Indication	0000 000 000 000 010	
34.	REG SEL Indication	0000 000 000 000 000	
35.	REG SEL Indication	0000 000 000 001 001	
36.	REG SEL Indication	0000 000 000 000 000	
37.	REG SEL Indication	0000 000 000 000 110	
38.	REG SEL Indication	0000 000 000 000 000	
39.	REG SEL Indication	0000 000 000 000 011	
40.	REG SEL Indication	0000 000 000 000 000	
41.	REG SEL Indication	0000 000 000 011 110	
42.	REG SEL Indication	0000 000 000 000 000	
43.	REG SEL Indication	0000 000 000 011 001	
44.	REG SEL Indication	0000 000 000 000 000	
45.	REG SEL Indication	0000 000 000 011 100	
46.	REG SEL Indication	0000 000 000 000 000	
47.	REG SEL Indication	0000 000 000 010 010	
48.	REG SEL Indication	0000 000 000 000 000	

DATE

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 05797
REV.

JOB NAVIGATION DSKY KEY TEST

Step	Parameter	Specification	Results
56	DSKY RESTART indicator is extenguished		
60	DSKY STBY Indicator illuminates after STBY Key is depressed		

DATE

JOB DSKY I/L INSTALLATION AND REMOVAL PROCEDURE - BLOCK II

JDC 05798 REV. — PAGE 1 OF 4

INITIAL TDRR 36883 D.S. PGS 0

SUBSYSTEM DSKY

ASSY.

DESCRIPTION

Procedure to remove or install DSKY Alarm Indicator at field level after DSKY is removed from Handling Fixture. This procedure may also be used to remove Alarm Indicator when DSKY is installed in the space craft.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA

REFERENCES

JDC 05123

IMPORTANT

INTERVAL

TOOLS AND MATERIAL

TOOLS AND MATERIAL:

1. 0-30 inch-pound Torque Wrench
2. Sealing Compound, part number MIL-S-22473, Grade HV

conductive

3. Silicone Compound, Thermo-conductive, part number 1006879, DC 340
4. Silicone Compound, part number MIL-S-8660, DC-4 ✓
5. Cotton Swabs
6. Freon TF

REMOVAL:

1. If DSKY is in Handling Fixture, remove it according to procedures in JDC 05123.

2. Insure that Protective Cap, part number 1006425-14, is in place on the J9 connector of the DSKY.

3. Place the DSKY face up (indicator light side) on a foam rubber pad approximately 1-inch thick and of sufficient dimension to accommodate the DSKY.

4. Remove the eight socket head screws and eight flat washers that mount the Front Cover to the DSKY.

5. Remove the Front Cover from the DSKY by lifting it away slowly while keeping the cover parallel to the front housing surfaces.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB DSKY I/L INSTALLATION AND REMOVAL PROCEDURE - BLOCK II

JDC 05798 REV PAGE 2 OF 4

SUBSYSTEM DSKY

ASSY

6. Jack the Digital Indicator and Cover Assembly from the Front Housing Assembly by turning the six jacking screws a quarter-turn at a time. Alternate between the screws so as to lift the indicator in parallel to its mounting surface while supporting the top portion of the indicator by hand maintaining the parallelism. See figure 1.

7. Remove the I/L Cover from the I/L Assembly by removing the six jacking screws from the cover. This is done by disengaging the "E" rings from the jacking screws which allows the jacking screws to be pulled through. Remove all flat washers.

INSTALLATION:

8. Clean the I/L assembly with Freon TF and cotton swabs, using it sparingly, and insure that rubber gasket is clean.

> CAUTION: Do not clean acrylic face of I/L with Freon TF or allow any to come into contact with acrylic face.

9. Apply a thin coating of silicone compound (1006897) to the mating surface of the Front Housing Assembly. Be careful not to get any on the gasket or in the tapped holes.

10. Fill female connectors on the Front Housing Assembly, which mate with the I/L Assembly, with silicone compound (MIL-S-8660).

> NOTE: Steps 9 and 10 utilize two different types of silicone compound.

11. Install a washer to the head of each jacking screw and insert the screws into the I/L Cover Assembly.

12. Place two washers over each screw thread where it protrudes through the I/L Cover Assembly.

13. Carefully lower the I/L Assembly over the cover so that the screws now protrude through the I/L Assembly as well as the cover, and the two washers on each screw act as shims providing a small gap between the I/L Cover and the I/L Assembly.

14. Place a flat washer over each screw protruding through the I/L and Cover Assembly and then install a retaining ring to each screw thereby holding the flat washer in place as well as making the screw captive.

15. Gently lower the I/L and Cover Assembly into position on the dowel pins of the Front Housing Assembly with the I/L and Cover Assembly placed approximately parallel to its mating surfaces. See Figure 1.

16. Turn the six jacking screws (do not force) a quarter-turn at a time, alternating between each screw (criss-cross method) until the assembly has been jacked down to the height of the bonded rubber gasket.

> NOTE: If any noticeable resistance is offered by the I/L and Cover Assembly during step 16, stop immediately and remove the Assembly. Inspect the screws, inserts, and contact pins prior to reinstalling.

DATE ______

JOB DSKY I/L INSTALLATION AND REMOVAL PROCEDURE BLOCK II

JDC 05798 REV — PAGE 3 OF 4

SUBSYSTEM DSKY

ASSY

17. Continue tightening the jacking screws a quarter-turn at a time (still alternating in a criss-cross manner) until a mounting torque of 8.5 to 9.5 inch-pounds has been achieved.

18. Clean the area of the pushbutton switches and indicators to insure that they are free of dust, silicone compound, etc., using Freon TF and cotton swabs.

19. Assemble the Front Cover Assembly to the Front Housing Assembly with eight socket head screws and flat washers by first lowering the Front Cover carefully into place on the Front Housing and then installing the screws and washers.

> NOTE: Ensure that dowel pins are properly aligned.

20. Torque the eight socket head screws 8 to 9 inch-pounds starting with the center screw and working outward around the perimeter of the cover until all screws are torqued down.

21. Return the DSKY to its Handling Fixture, if applicable, following procedures in JDC 05123.

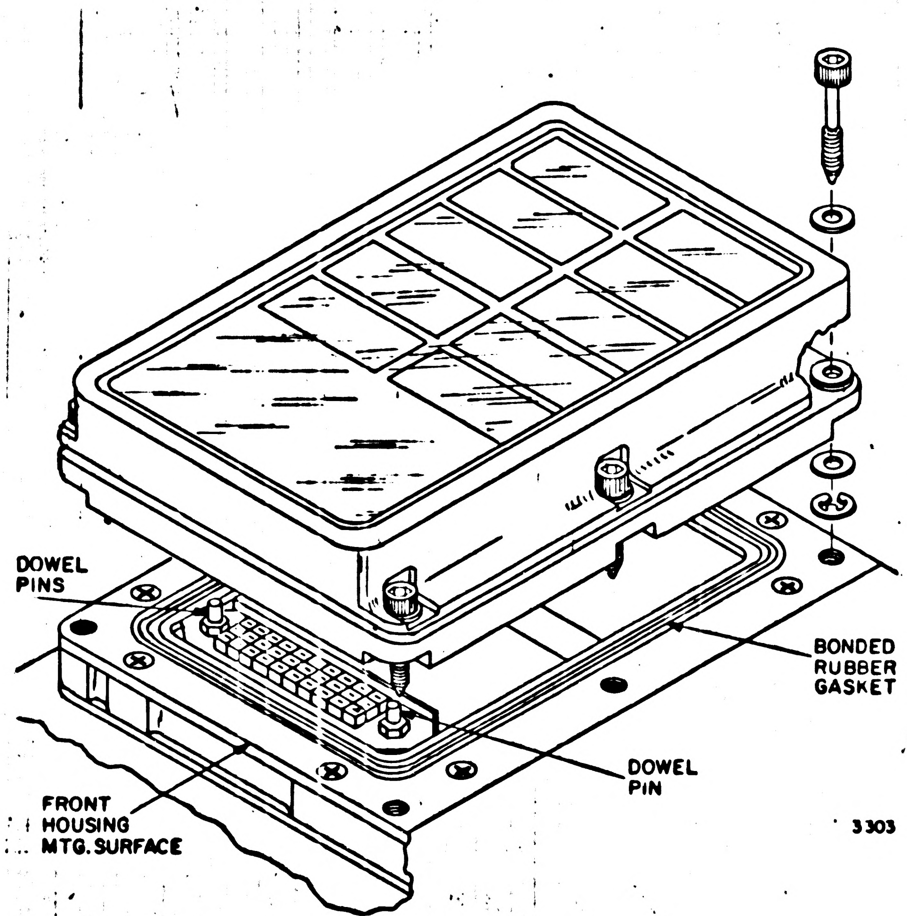
DATE ______

JOB DSKY I/L INSTALLATION AND REMOVAL PROCEDURE - BLOCK II

JDC 05798 REV — PAGE 4 OF 4

SUBSYSTEM

ASSY



DATE ______

JOB DSKY E/L INSTALLATION AND REMOVAL PROCEDURE - BLOCK II

JDC 05799 REV. — PAGE 1 OF 4

INITIAL TDRR 36884 D.S. PGS 0

SUBSYSTEM DSKY

ASSY.

DESCRIPTION

Procedure to remove or install DSKY E/L Assembly at field level after DSKY is removed from Handling Fixture. This procedure may also be used to remove E/L when DSKY is installed in the space craft.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL		REFERENCES
			JDC	D.S.	MIT	NASA	JDC 05123
							IMPORTANT
							INTERVAL
							TOOLS AND MATERIAL
							See Below

TOOLS AND MATERIAL:

1. 0-30 inch-pound Torque Wrench

2. Sealing Compound, part number MIL-S-22473, Grade HV

conductive,

3. Silicone Compound, Thermo-conductive, part number 1006879, DC 340
4. Silicone Compound, part number MIL-S-8660, DC-4

5. Cotton Swabs

6. Freon TF

REMOVAL:

1. If DSKY is in Handling Fixture, remove it according to procedures in JDC 05123.

2. Insure that Protective Cap, part number 1006425-14, is in place on the J9 connector of the DSKY.

3. Place the DSKY face up (indicator light side) on a foam rubber pad approximately 1-inch thick and of sufficient dimension to accommodate the DSKY.

4. Remove the eight socket head screws and eight flat washers that mount the Front Cover to the DSKY.

5. Remove the Front Cover from the DSKY by lifting it away slowly while keeping the cover parallel to the front housing surfaces.

VERIFICATION WITH SIOL REQUIRED BEFORE USE DATE ______

JOB DSKY E/L INSTALLATION AND REMOVAL PROCEDURE - BLOCK II

JDC 05799 REV — PAGE 2 OF 4

SUBSYSTEM DSKY

ASSY

6. Jack the E/L and Cover Assembly from the Front Housing Assembly by turning the six jacking screws a quarter-turn at a time. Alternate between the screws so as to lift the indicator in parallel to its mounting surface while supporting the top portion of the indicator by hand maintaining the parallelism. See Figure 1.

7. Remove the E/L Cover from the E/L Assembly by removing the six jacking screws from the cover. This is done by disengaging the "E" rings from the jacking screws which allows the jacking screws to be pulled through. Remove all flat washers.

INSTALLATION:

8. Clean the E/L Assembly with Freon TF and cotton swabs, using it sparingly, and insure that rubber gasket is clean.

~~CAUTION: Do not clean acrylic face of E/L with Freon TF or allow any to come into contact with acrylic face.~~

9. Apply a thin coating of silicone compound (1006897) to the mating surface of the Front Housing Assembly. Be careful not to get any on the gasket or in the tapped holes.

10. Fill female connectors on the Front Housing Assembly, which mate with the E/L Assembly, with silicone compound (MIL-S-8660.

NOTE: Steps 9 and 10 utilize two different types of silicone compound.

11. Install a washer to the head of each jacking screw and insert the screws into the E/L Cover Assembly.

12. Place two washers over each screw thread where it protrudes through the E/L Cover Assembly.

13. Carefully lower the E/L Assembly over the cover so that the screws now protrude through the E/L Assembly as well as the cover, and the two washers on each screw act as shims providing a small gap between the E/L Cover and the E/L Assembly.

14. Place a flat washer over each screw protruding through the E/L and Cover Assembly and then install a retaining ring to each screw thereby holding the flat washer in place as well as making the screw captive.

15. Gently lower the E/L and Cover Assembly into position on the dowel pins of the Front Housing Assembly with the E/L and Cover Assembly placed approximately parallel to its mating surfaces.

16. Turn the six jacking screws (do not force) a quarter-turn at a time, alternating between each screw (criss-cross method) until the assembly has been jacked down to the height of the bonded rubber gasket.

NOTE: If any noticeable resistance is offered by the E/L and Cover Assembly during step 16, stop immediately and remove the Assembly. Inspect the screws, inserts, and contact pins prior to reinstalling.

DATE ______

JOB DSKY E/L INSTALLATION AND REMOVAL PROCEDURE - BLOCK II

JDC 05799 REV — PAGE 3 OF 4

SUBSYSTEM DSKY

ASSY

17. Continue tightening the jacking screws a quarter-turn at a time (still alternating in a criss-cross manner) until a mounting torque of 8.5 to 9.5 inch-pounds has been achieved.

18. Clean the area of the pushbutton switches and indicators to insure that they are free of dust, silicone compound, etc., using Freon TF and cotton swabs.

19. Assemble the Front Cover Assembly to the Front Housing Assembly with eight socket head screws and flat washers by first lowering the Front Cover carefully into place on the Front Housing and then installing the screws and washers.

NOTE: Ensure that dowel pins are properly aligned.

20. Torque the eight socket head screws 8 to 9 inch pounds starting with the center screw and working around the perimeter of the cover until all screws are torqued down.

21. Return the DSKY to its Handling Fixture, if applicable, following procedures in JDC 05123.

/3

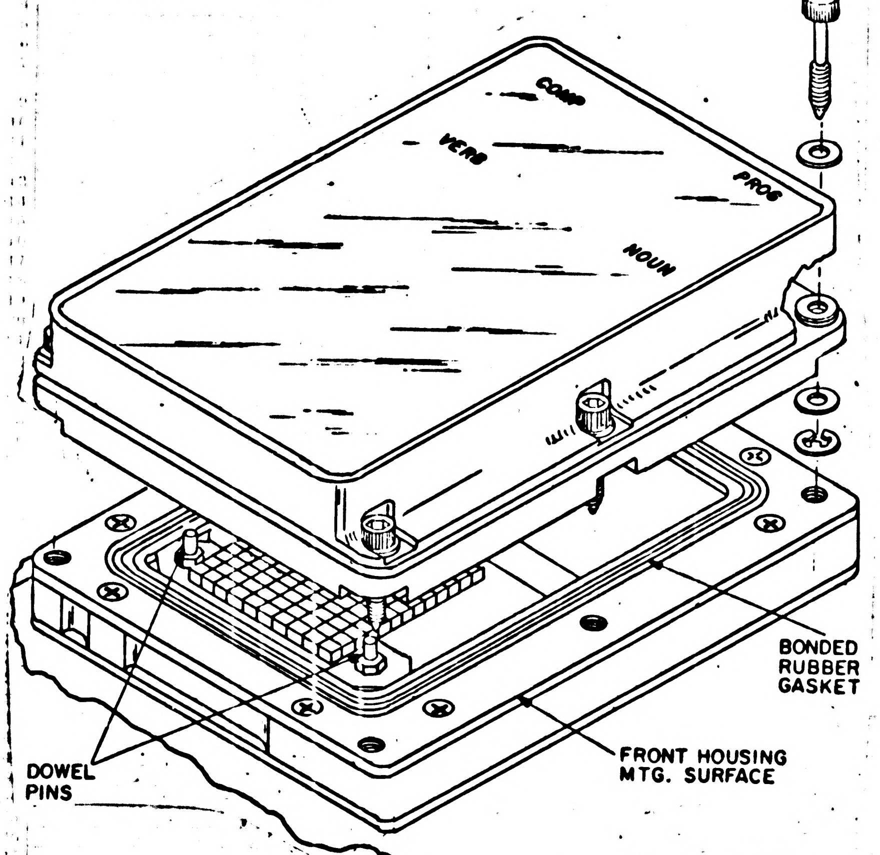
DATE ______

JOB DSKY E/L INSTALLATION AND REMOVAL PROCEDURE - BLOCK II

JDC 05799 REV — PAGE 4 OF 4

SUBSYSTEM DSKY

ASSY



3304

DATE ______

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING
JDC 10002 **REV.** A **PAGE** 1 **OF** 14
INITIAL TDRR - **D.S PGS** -
SUBSYSTEM G & N SYSTEM
ASSY.
DESCRIPTION Assembly of Guidance Components into a complete G & N System Test Configuration and preparation of GSE and G & N System for acceptance testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	12-21-65	24814	10	-	WK	-

REFERENCES

IMPORTANT: See below.

INTERVAL

TOOLS AND MATERIAL: See below.

TOOLS AND MATERIAL: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended may be substituted.

Item No.	Number Req'd	Description
1	1 Set	A set of torque wrenches with a range of 1-250 inch pounds with adapters.
2	1	IMU and Optics Navigation Base Ass'y. Sling and Handling Fixture.
3	1	PSA End Connector and Cable Harness Handling Fixture.
4	1	G & N System Equipment #1015000 Dwg.

IMPORTANT: The G & N System must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G & N system and components. Performance of this JDC requires 3 men during steps B. 2 through B. 51.

A. SAFETY REQUIREMENTS

1. All circuit breakers supplying OIA power to G & N equipment shall be in the OFF position.

2. All signal carrying circuits beginning, terminating, or going thru the G & N equipment shall be de-energized, except for IMU auxiliary temperature control.

---

3. All tools shall be in proper operating condition.

4. A thorough visual examination of all equipment shall be performed to detect possible physical damage and to check for sharp edges and abrasion points which could be hazardous to personnel installing G & N equipment as well as to cable bundles, harnesses and connectors.

B. PROCEDURES

NOTE: All directions given are for a technician facing south in front of the G & N Mounting Fixture.

NOTE: Insure that the IMU and AGC cold plate have been purged and filled. If not, refer to JDC 18045 for procedures.

GSE-GSE Preparations

1. Place Prime Power Circuit breaker located on the back of the OIA console to OFF.

2. Mount the AGC Buffer Assembly (1020307) to its mounting frame on the lower front of the G & N Mounting Fixture Cradle. Secure with seven (7) 1/2" 10-24 button head screws (P/N 1006783-38), with seven (7) #10 lockwashers (P/N MS-35338-81).

3. Insure that the following cables are connected. (Exceptions noted) Insure that no other cables between the GSE J-Box and the GSE consoles are connected.

NOTE: The cable interconnections specified to CTS are necessary only when performing JDC's 10034, 10036, or 10039. If these JDC's are not to be performed it is not necessary to make the appropriate cable interconnections to the CTS.

Table I

GSE-GSE Interconnections

From	Conn. NO.		Cable and Drawing NO.	Conn. NO.		To
OIA	J1	P1	W1 (1900886)	P2	J1	Osc. Console
	J2	P1	W2 (1900669)	P2	J2	
	J3	P1	W3 (1900670)	P2	J3	
	J4	P1	W4 (1900671)	P2	J4	
	E1		W33 (1901404)		E4	
	J20	P1	W19 (1900873)	P2	J3	Coolant and Power Console
	A30J2	P1	W27 (1900871)	P2	J1	
	A30J1	P1	W26 (1900921)****	P2		Wall Power
	A30J5	P1	W85 (1901960)****	P2		Aux Wall Power
	J23	P1	W22 (1900959)	P2	J5	CTS
	J26	P1	W25 (1900918)	P2	J7	GSE J Box
	J11	P1	W11 (1900975)*	P2	J13	PSA TPA
				P3	P3	W31
	J10	P1	W10 (1900976)*	P2	J12	PSA TPA
	E80		W69 (1902319)		E1	G & N Fixture Base
	E1		W82 (1901683)**		E1	
	E1		W35 (1901660)***		E300	Rotary Table
	J6	P1	W96 (1902347)*	P4	P1	W83
	J7	P2				
	J12	P3		P5	J1	Star Simulator (1019883)
	J16	P1	W31 (1901302)*	P2	J2	AGC/PSA/SC Adapter (1020311)
				P3	P3	W11

*NOTE: Do not connect cables W10 and W11 to PSA TPA, or cables W31 and W96 to OIA. These cables will be connected later in accordance with specified procedures.

** System test station only

*** Universal test station only

**** Cable W26 must be connected before cable W85.

Table I (cont)

GSE-GSE Interconnections

From	Conn. NO.		Cable and Drawing NO.	Conn. NO.		To
Coolant and Power Console	J2	P1	W28 (1900872)	P2		Wall power
	J4	P1	W29 (1900879)	P2	J6	GSE J-Box
	E1		W34 (1901614)***		E300	Rotary Table
	E1		W80 (1901681)**		E1	G & N Fixture Base
Current Source Monitor Panel	J4	P1	W65 (1900739)	P2	J15	PSA TPA
CTS	J4	P2	W200 (1020241)	P1	J1	Buffer Assy. (1020307)
	J9	P2	W201 (1020242-1)	P1	J2	
	J13	P2	W202 (1020242-2)	P1	J3	
	J14	P2	W203 (1020244)	P1	J9	
	J1		Power			Wall power
	J8	P2	W209 (1020284)*	P1	J1	AGC/PSA/SC adapter (1020311)
	J2	P3				
	J7	P4		J1	P2	W211
	J11	P5		J2	P6	W211
AGC Calibration Console*		P1	W207 (1020253)*	P4	J7	Buffer Assy. (1020307)
		P2		P5	J8	
		P3				

*NOTE: Do not connect cable W65, W209 (to CTS), or W207. These connections will be made later in accordance with specified procedures.

** System Test station only

*** Universal test station only

Table I (cont)

FROM	Conn. NO.		Cable and Drawing NO.	Conn. NO.		To
GSE-GSE Interconnections						
AGC Calibration Console* (cont)		P7 P8	W207 (1020253)*	P6	J2	W209
Facility grd.			W37 (1901662)***			
G and N Fixture Cradle	E2		W66 (1901677)		E1	G and N Fixture Base
G and N Fixture Base	E1		W81 (1901682)**			Facility grd.
	E1		W64 (1901676)***		E300	Rotary Table
	E1		W86 (1902095)		E1	CTS
	E1		W98 (1902369)		E1	GSE J-Box
AGC Calibration Console	E1		Raytheon cable		E1	CTS
AGC 05A7J2	A50 J2	P4	W205 (1020270)*	P1 P2 P3	J4 J5 J6	Buffer Assembly

*NOTE: Do not connect W205 to Buffer Assembly or cable W105 to 56P9. These connections will be made later in accordance with specified procedures.

** System test station only

*** Universal test station only

Installation of PSA End Connector and Cable Harness

4. Remove structural support panels from the G & N Mounting Fixture and retain hardware for use in step B.57. Set G & N Mounting Fixture Cradle to approximately horizontal.

5. Remove all screws holding the End Connector to the PSA End Connector and Cable Harness Handling Fixture.

6. Pick up the PSA End Connector and Cable Harness Handling Fixture and place it as far back as possible in the G & N Mounting Fixture.

7. Release the clamps holding the CDU wire trunk and the DSKY wire trunk.

8. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G & N Mounting Fixture as the PSA End Connector and Harness Trunk Handling Fixture is moved forward. When the End Connector is in its approximate position, set the PSA End Connector and Cable Harness Handling Fixture down.

9. Release all other clamps holding harness trunks.

10. With two men supporting harness trunks and the End Connector, remove the PSA End Connector and Cable Harness Handling Fixture.

11. Place PSA End Connector over mounting holes in G & N Mounting Fixture Cradle.

NOTE: [illegible] alignment of the [illegible] Coldplate and the G & N Mounting Fixture cradle has been disturbed, it is necessary to insert the 2 outside screws (in the row of 4) through the bottom of the G & N Mounting Fixture into the PSA End Connector guide screw receptacles first. The remaining 4 screws are then inserted.

12. Install six 10-32, 1-1/2 inch socket head screws (MS16996-16) and 6 flat washers (AN960C10) to secure the PSA End Connector in the G & N Mounting Fixture Cradle. Torque screws to 20-25 inch-pounds.

13. Secure left D&C Harness Trunk (upper trunk) to left side of G & N Mounting Fixture torquing clamp bolts down snug.

Installation of Optics Navigation Base

14. Insure that the IMU mounting surfaces on the Navigation Base are clean and free of burrs after removing protective pads.

15. Install the Optics Navigation Base Handling Fixture (1901426) to the Navigation Base.

16. Install four eye bolts in the Optics Navigation Base Handling Fixture.

17. Attach the sling to the monorail hoist.

18. Attach the sling to the four eye bolts on the Optics Navigation Base Handling Fixture.

19. Raise the Optics Navigation Base Assembly from its container.

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20. Adjust the sling so that the Optics Navigation Base Assembly is approximately horizontal.

21. Remove the two upper and one lower pad and ball mount assemblies from the G & N Mounting Fixture.

22. Carefully examine the mating surfaces of the Optics Navigation Base and the ball mount assemblies to insure that they are clean and free of burrs.

23. Attach the ball mount assemblies to the Optics Navigation Base Assembly as illustrated. Tighten the six ball mount bolts finger tight.

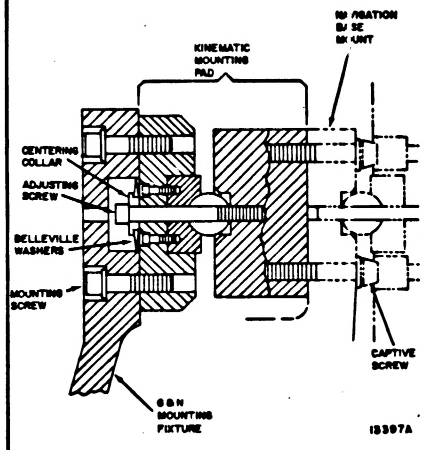
NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

24. Taking care to center the Belleville washers, torque the 3 adjusting screws for preloading the kinematic mount balls to 5-7 inch-pounds.

25. Carefully examine the mating surfaces of the mounting pads and the G & N Mounting Fixture frame to insure that they are clean and free from burrs.

26. Slowly and carefully move the Optics Navigation Base Assembly to the correct position over the G & N Mounting Fixture.

27. Lower the assembly slowly and carefully to its mating position over the G & N Mounting Fixture taking care to avoid interference with the PSA End Connector and Cable Harness.



Installation of Mounting Pads
(Cross-Sectional View)

28. When the locating pin holes of the 3 kinematic mount pads are lined up with the corresponding pins on the G & N Mounting Fixture complete the lowering of the assembly.

29. Install all six kinematic mount pad bolts finger tight.

30. Torque all 12 bolts, 6 for the 3 ball mounts and 6 for the pads, to 90-100 inch-pounds. Tighten the 3 adjusting screws for preloading the kinematic mount balls until centering collar bottoms. Loosen adjusting screws 1/8 turn.

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31. Remove the Optics Navigation Base Handling Fixture, P/N 1901426 from the Optics Navigation Base Assembly. Fasten Guard and Seal Assembly to G & N Mounting Fixture. Tighten the 2 screws down snug.

32. Secure left hand IMU Optics Cable Harness to the Optics Navigation Base.

33. Secure right hand IMU Optics Cable Harness to the Optics Navigation Base.

Installation of the IMU

34. Insure that the Portable Temperature Controller is attached to the IMU and is operating properly. See that the extension cable is coiled neatly, with no tangles so that it can be played out smoothly. Allow the IMU outer shell to cool to room temperature for 1 hour before installing in the G & N Mounting Fixture.

35. Attach the four eye bolts to the IMU. Attach the sling to the four eye bolts on the IMU.

36. Carefully hoist the IMU to a convenient level and remove protective mounting pads from the IMU.

37. Thoroughly examine the IMU mounting surfaces to insure that they are clean and free from burrs.

38. Remove protective mounting pads from Optics Navigation Base IMU mounting surfaces. Thoroughly examine the Optics Navigation Base mounting surfaces to insure that they are clean and free from burrs.

39. Remove Snap-On Bellows from IMU.

40. Position the IMU above the G & N Mounting Fixture.

41. Transfer and lower the IMU into position so that the IMU mounting pads are approximately lined up with the Optics Navigation Base mounting pads.

42. Lower the IMU slowly insuring that the guide pins line up with the guide holes on the IMU mounting surface.

43. Lower the IMU into its final position.

44. Remove the sling and eye bolts from the IMU.

45. Torque each of the mounting bolts to 55-60 inch-pounds.

46. Set the tilt axis of the G & N Mounting Fixture to 0° (±1°).

NOTE: Loosen mounting bolts to insure that IMU is resting on alignment pins.

47. Torque the four IMU bolts to 195-200 inch-pounds in 25 inch-pound increments in the following sequence. Torque bolt in hole with locating pin first. Second torque bolt diagonally across from it. Third torque bolt in the slot. Fourth torque bolt diagonally across from it.

48. Fasten connector 56P5 on the end of the left hand cable to the Sextant connection 10J1.

49. Fasten connector 56P4 on the end of the left hand cable to the Sextant electronics package connector 10J2. Alternately, tighten each screw two turns until both are torqued down snug.

50. Fasten connector 56P8 on the end of the right hand cable to the Scanning Telescope connector 20J1.

51. Mate the connectors 56P2, 56P7 and 56P3 on cable to IMU connectors 35J1, 35J4 and 35J3.

(NOTE: Connector 35J2 is not mated at this time because heaters must remain attached to power thru the portable temperature controller until power can be supplied by the GSE thru Tray 7 of the PSA.)

52. Connect Flexible Hose Assembly from the IMU Coolant Supply outlet to the inlet valve of the IMU.

53. Connect Flexible Hose Assembly from the IMU outlet valve to the IMU Coolant Supply inlet.

Installation of PSA Trays

54. Obtain PSA Trays 1 thru 10 and insert in reverse sequence starting with Tray 10 using left hand to guide rear tongue into its slot and assist in mating the connectors. In turn, engage the captivated screws into toe plate inserts and torque each screw to 15-20 inch-pounds.

55. Mate connector W18-P2 with connector 45A7J2 and W18-P1 with OIA connector J19 torquing the captivated screws to 7-10 inch-pounds.

56. Connect Flexible Hose Assembly from the PSA Coolant Supply to the inlet and exit valves on the PSA cold plate.

Installation of D&C Electronics

57. Attach structural support panel to G & N Mounting Fixture using hardware retained in step B-4. Tighten eight (8) screws down snug. Obtain D&C Electronics. Position it so that the mounting holes line up with the corresponding insert holes in the left hand structural support panel.

58. Insert four screws and torque them to 10 inch-pounds in 2 inch-pound increments.

59. Mate connector 56P1 to connector 50A3J1 on the D&C Electronics. Torque jacking screw to 5-7 inch-pounds.

Installation of Control Electronics

60. Obtain the Control Electronics Assembly and mount it on the right hand structural support with the four screws.

61. Torque the screws to 10 inch-pounds in 2 inch-pound increments.

62. Mate connector 56P10 to connector 50A4J1 on the Control Electronics Assembly. Torque the jacking screw to 5-7 inch-pounds.

Installation of G & N AGC DSKY

63. Install and secure AGC DSKY on upper right frame of G & N Mounting Fixture Cradle. Guide pins will insure proper positioning of DSKY. Torque eight captive bolts to 8-10 inch-pounds.

64. Hold and support 56J10 and screw AGC DSKY connector screw into 56J10 torquing the screw to 5-7 inch-pounds.

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65. Secure right D&C Harness Trunk (upper trunk) to right side of G & N Mounting Fixture Cradle torquing the clamp bolt down snug.

Installation of IMU Control Panel

66. Install and secure IMU Control Panel in upper left frame of G & N Mounting Fixture Cradle. Guide pins insure proper position of IMU Control Panel. Torque four captive screws to 8-10 inch-pounds.

67. Hold and support connector 56J6 and screw IMU Control Panel Connector screw into 56J6 torquing it to 5-7 inch-pounds.

Installation of CDU's

68. Install and secure CDU connectors 56J2, 56J1, 56J3, 56J4 and 56J5 in the listed order to the CDU Mounting Frame using special studs P/N 1016889 and flex lock nuts P/N AN365D-440 torqued to 5-7 inch-pounds.

69. Secure upper clamp to the J5, J4 harness and the lower clamp to the J3, J2, J1 harness torquing the clamp bolts down snug.

70. Obtain the five CDU Assemblies and insert them into place in sequence starting with the top and working down. Insure that the correct CDU assemblies are inserted in the correct CDU frame position. Insert the tongue in the slot at the rear and then engage and torque the captivated jacking screws to 35-40 inch-pounds.

71. Obtain the CDU cover panel and fasten it in place over the CDU module boxes torquing the 4 captivated screws to 7-10 inch-pounds.

Installation of the Condition Annunciator Assembly

72. Obtain the Condition Annunciator Assembly and secure it to the G & N Mounting Fixture Left Hand Rack Assembly (1901874) using two screws. Torque all four screws to 7-10 inch-pounds.

73. Mate connector 56J8 to connector P1. Torque the jacking screw to 5-7 inch-pounds.

74. Connect cable W83 P2 to 56P9 and W83 P1 to W96 P4. Connect W96 P5 to Star Simulator J1. Do not connect the other end of cable W96 to OIA connectors J6, J7 and J12 at this time.

Installation of AGC

75. Remove AGC Handling Fixture top cover. Remove terminal of AGC Ground Strap Assembly (P/N 1020276) connected to the side of AGC Handling Fixture. Connect 05A5P4 to Interface Connector J on AGC. Slide the AGC and cold plate into the G and N Mounting Fixture. Torque the holding screws to 40-50 inch-pounds.

76. Tilt the G and N Mounting Fixture to a convenient position so that the AGC is accessible. Connect AGC Ground Strap Assembly terminal removed in step 75 to ground terminal E2 of G and N Mounting Fixture Cradle.

77. Mate connector 05A5P1 to 56J21, connector 05A5P2 to 56J22, connector 05A5P6 to 56J23, connector 05A5P7 to 56J24, connector 05A5P4 to 05A7J1, and connector 05A5P5

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to 05A7J2. Torque the jacking screws finger tight.

78. Connect PSA/AGC/SC Adapter (1020311) to 05A5P3 of AGC and connect W205-P4 (1020270) to 05A7J2 (A50) of AGC. Tilt G & N Mounting Fixture to approximately 0°.

79. Connect the Flexible Hose Ass'y from the AGC coolant supply to the inlet and exit valves of the AGC coldplate.

Installation of Main Panel DSKY

80. Mount the Main Panel DSKY on the stand torquing all screws to 7-10 inch-pounds.

81. Connect W211-P1 to 05A8J1. Torque jacking screw to 7-10 inch-pounds.

Power Turn On of OIA

82. Place the Prime Power Circuit Breakers on the back of the OIA Coolant Supply and Oscillograph Consoles to ON.

83. Set ICTC POWER SWITCH on BATTERY POWER PACK (1900011) to OFF, if present in the configuration.

84. Set PTC Power Switch to OFF.

85. Remove PTC Power Cable connector P2 from connector J2 on the IMU.

86. Connect G & N System Harness cable connector 56P6 to connector J2 on the IMU.

87. Apply power to the TEMPERATURE MONITOR CONTROL panel by pressing the 115V 60 cps CONTROL SWITCH.

88. Set the ALARM DISABLE switch on the back of the MONITOR PANEL to ALARM ENABLE.

89. Set the MONITOR METER SELECT switch to AUX HTR CURRENT and observe presence of heater current as indicated on the MONITOR METER.

90. Set the MONITOR METER SELECT switch to AUX IRIG and observe that the indicated temperature on the MONITOR METER is within the range of -5 to +5° F.

Installation of Optics Shroud Assembly and Optics Eyepieces

91. Obtain Optics Shroud Assembly and install on G & N Mounting Fixture. Torque all six captive screws to 8-10 inch-pounds.

92. Obtain Optics eyepieces and install on Sextant and Telescope. Tighten both eyepieces down finger tight.

Installation of the G & N Indicator-Control Panel

93. Position the G & N Indicator Control Panel near its mounting surface on the G & N Mounting Fixture. Reach underneath and mate connector 56J9 to connector 50A1P1. Torque jacking screw on the front of the G & N Indicator Panel to 5-7 inch-pounds.

94. Mount the G & N Indicator Control Panel insuring that the guide pins enter the guide holes. Torque the captivated screws to 7-10 inch-pounds.

Installation of Tracker X & Y Assembly

95. Install the Tracker X & Y Assembly behind the G & N AGC DSKY on the G & N

Mounting Fixture with the four screws.

96. Torque screws to 15-20 inch-pounds.

97. Mate connector 56P13 to connector 45A12J1 on the Tracker X & Y Assembly. Torque the jacking screw to 5-7 inch-pounds.

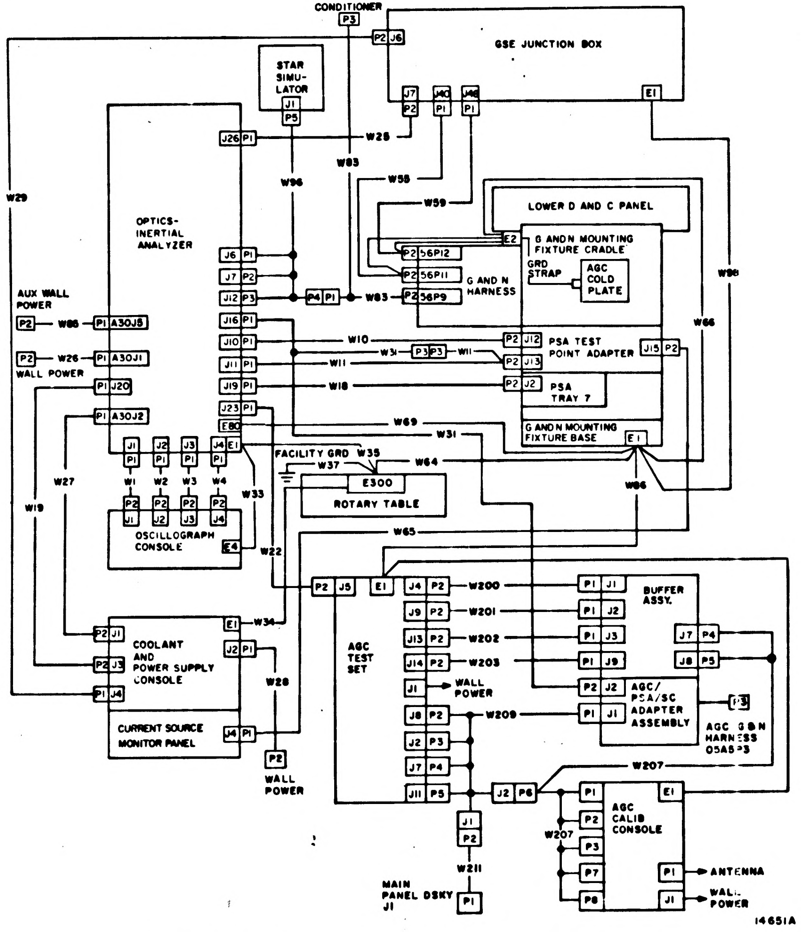
SIGNAL CONDITIONER
GSE JUNCTION BOX
STAR SIMULATOR
OPTICS-INERTIAL ANALYZER
LOWER D AND C PANEL
G AND N MOUNTING FIXTURE CRADLE
GRD STRAP
AGC COLD PLATE
G AND N HARNESS
PSA TEST POINT ADAPTER
PSA TRAY 7
G AND N MOUNTING FIXTURE BASE
AUX WALL POWER
WALL POWER
FACILITY GRD
ROTARY TABLE
E300
OSCILLOGRAPH CONSOLE
COOLANT AND POWER SUPPLY CONSOLE
CURRENT SOURCE MONITOR PANEL
AGC TEST SET
BUFFER ASSY.
AGC/PSA/SC ADAPTER ASSEMBLY
AGC G&N HARNESS 05A5P3
AGC CALIB CONSOLE
ANTENNA
MAIN PANEL DSKY J1
W29
W25
W83
W96
W58
W59
W98
W66
W86
W26
W10
W31
W11
W18
W69
W64
W35
W37
W27
W19
W1
W2
W3
W4
W33
W22
W65
W34
W28
W200
W201
W202
W203
W209
W207
W211
14651A

Figure 1. G & N Universal Test Station Cabling Diagram

DATE 12 AUG 65

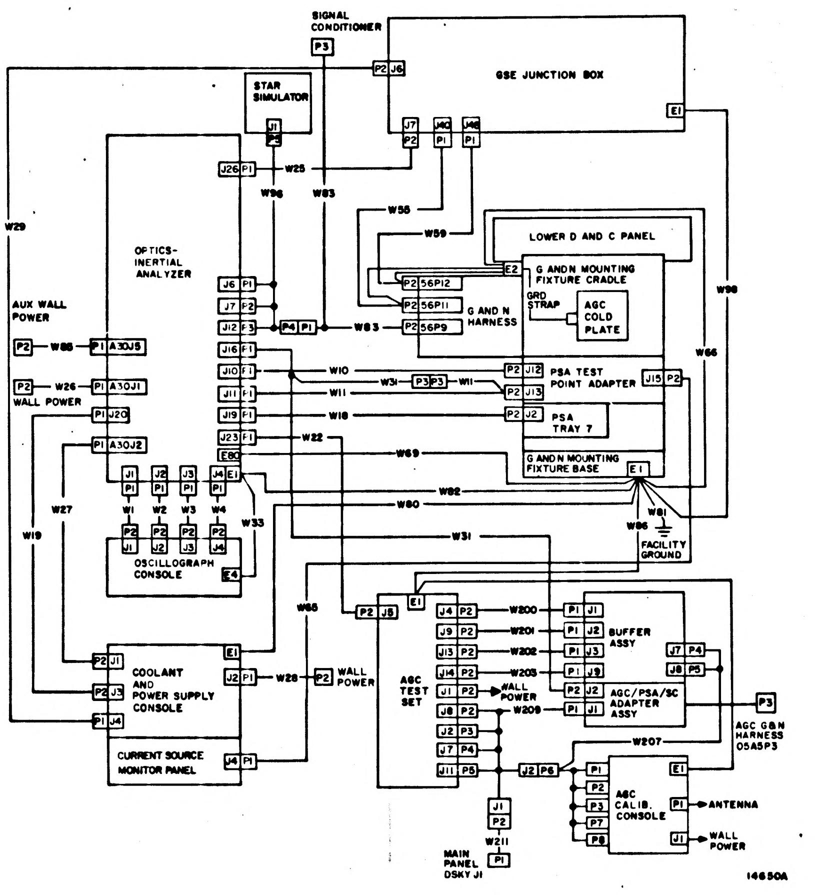
SIGNAL CONDITIONER
GSE JUNCTION BOX
STAR SIMULATOR
OPTICS-INERTIAL ANALYZER
LOWER D AND C PANEL
G AND N MOUNTING FIXTURE CRADLE
GRD STRAP
AGC COLD PLATE
G AND N HARNESS
PSA TEST POINT ADAPTER
PSA TRAY 7
G AND N MOUNTING FIXTURE BASE
AUX WALL POWER
WALL POWER
FACILITY GROUND
OSCILLOGRAPH CONSOLE
COOLANT AND POWER SUPPLY CONSOLE
CURRENT SOURCE MONITOR PANEL
AGC TEST SET
BUFFER ASSY
AGC/PSA/SC ADAPTER ASSY
AGC G&N HARNESS 05A5P3
AGC CALIB. CONSOLE
ANTENNA
MAIN PANEL DSKY J1
W29
W25
W96
W83
W58
W59
W98
W66
W86
W26
W10
W31
W11
W18
W22
W69
W82
W80
W81
W27
W19
W1
W2
W3
W4
W33
W65
W28
W200
W201
W202
W203
W209
W207
W211
14650A

Figure 2. G & N System Test Station Cabling Diagram

DATE 12 AUG 65

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

JDC 10002 **REV.** B **PAGE** 1 **OF** 14

INITIAL TDRR - **D.S. PGS** -

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION Assembly of Guidance Components into a complete G & N System Test Configuration and preparation of GSE and G & N System for acceptance testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	12-21-65	24814	10	-	WK	-
B	5-6-66	28576	2-5, 7-11	-	MM	ACM

M

REFERENCES

IMPORTANT: See below.

INTERVAL

TOOLS AND MATERIAL: See below.

TOOLS AND MATERIAL: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended may be substituted.

Item No.	Number Req'd	Description
1	1 Set	A set of torque wrenches with a range of 1-250 inch pounds with adapters.
2	1	IMU and Optics Navigation Base Ass'y. Sling and Handling Fixture.
3	1	PSA End Connector and Cable Harness Handling Fixture.
4	1	G & N System Equipment #1015000 Dwg.

IMPORTANT: The G & N System must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G & N system and components. Performance of this JDC requires 3 men during steps B.2 through B.51.

A. SAFETY REQUIREMENTS

1. All circuit breakers supplying OIA power to G & N equipment shall be in the OFF position.

2. All signal carrying circuits beginning, terminating, or going thru the G & N

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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equipment shall be de-energized, except for IMU auxiliary temperature control.

3. All tools shall be in proper operating condition.

4. A thorough visual examination of all equipment shall be performed to detect possible physical damage and to check for sharp edges and abrasion points which could be hazardous to personnel installing G & N equipment as well as to cable bundles, harnesses and connectors.

B. PROCEDURES

NOTE: All directions given are for a technician facing south in front of the G & N Mounting Fixture.

NOTE: Insure that the IMU and AGC cold plate have been purged and filled. If not, refer to JDC 18045 for procedures.

GSE-GSE Preparations

1. Place Prime Power Circuit breaker located on the back of the OIA console to OFF.

2. Mount the AGC Buffer Assembly (1020307) to its mounting frame on the lower front of the G & N Mounting Fixture Cradle. Secure with seven (7) 1/2" 10-24 button head screws (P/N 1006783-38), with seven (7) #10 lockwashers (P/N MS-35338-81).

3. Insure that the following cables are connected. (Exceptions noted) Insure that no other cables between the GSE J-Box and the GSE consoles are connected.

NOTE: The cable interconnections specified to CTS are necessary only when performing JDC's 10034, 10036, or 10039. If these JDC's are not to be performed it is not necessary to make the appropriate cable interconnections to the CTS. When using 100/Block II/ LEM OIA, replace specified cable with cable indicated by †

Table I

GSE-GSE Interconnections

From	Conn. NO.		Cable and Drawing NO.	Conn. NO.		To
OIA	J1	P1	W1 (1900886)	P2	J1	Osc. Console
	J2	P1	W2 (1900669)	P2	J2	
	J3	P1	W3 (1900670)	P2	J3	
	J4	P1	W4 (1900671)	P2	J4	
	E1	P1	W33 (1901404)	P2	E4	
	J20	P1	W19 (1900873)	P2	J3	Coolant and Power Console
	A30J2	P1	W27 (1900871)	P2	J1	
	A30J1	P1	W26 (1900921)****	P2		Wall Power
	A30J5	P1	W85 (1901960)****	P2		Aux Wall Power
	J23	P1	W22 (1900959) Δ	P2	J5	CTS
	J26	P1	W25 (1900918)	P2	J7	GSE J Box
	J11	P1	W11 (1900975)*	P2	J13	PSA TPA
				P3	P3	W31
	J10	P1	W10 (1900976)*	P2	J12	PSA TPA
	E80	P1	W69 (1902319) W127 (2900327)†	P2	E1	G & N Fixture Base
	E1		W82 (1901683)**		E1	
	E1	P1	W35 (1901660)*** W127 (2900327)†	P2	E300	Rotary Table
	J6	P1	W96 (1902347)*	P4	P1	W83
	J7	P2				
	J12	P3		P5	J1	Star Simulator (1019883)
	J16	P1	W31 (1901302)*	P2	J2	AGC/PSA, SC Adapter (1020311)

*NOTE: Do not connect cables W10 and W11 to PSA TPA, or cables W31 and W96 to OIA. These cables will be connected later in accordance with specified procedures.

** System test station only **** Cable W26 must be connected before cable W85.

*** Universal test station only Δ Not required when using 100/ Block II/ LEM OIA.

Table I (cont)

GSE-GSE Interconnections

From	Conn. NO.		Cable and Drawing NO.	Conn. NO.		To
Coolant and Power Console	J2	P1	W28 (1900872)	P2		Wall power
	J4	P1	W29 (1900879)	P2	J6	GSE J-Box
	E1	P1	W34 (1901614)*** W130 (2900460)†	P2	E300	Rotary Table
	E1		W80 (1901681)**		E1	G & N Fixture Base
Current Source Monitor Panel	J4	P1	W65 (1900739)	P2	J15	PSA TPA
CTS	J4	P2	W200 (1020241)	P1	J1	Buffer Assy. (1020307)
	J9	P2	W201 (1020242-1)	P1	J2	
	J13	P2	W202 (1020242-2)	P1	J3	
	J14	P2	W203 (1020244)	P1	J9	
	J1		Power			Wall power
	J8	P2	W209 (1020284)*	P1	J1	AGC/PSA/SC adapter (1020311)
	J2	P3				
	J7	P4		J1	P2	W211
	J11	P5		J2	P6	W207
AGC Calibration Console*		P1 P2 P3	W207 (1020253)*	P4 P5	J7 J8	Buffer Assy. (1020307)

*NOTE: Do not connect cable W65, W209 (to CTS), or W207. These connections will be made later in accordance with specified procedures.

** System Test station only

*** Universal test station only

Table I (cont)

GSE-GSE Interconnections						
FROM	Conn. NO.		Cable and Drawing NO.	Conn. NO.		To
AGC Calibration Console* (cont)		P7 P8	W207 (1020253)*	P6	J2	W209
Facility grd.	E1	P1	W37 (1901662)***	P2	E300	Rotary Table
G and N Fixture Cradle	E2		W66 (1901677)		E1	G and N Fixture Base
G and N Fixture Base	E1		W81 (1901682)**			Facility grd.
	E1		W64 (1901676)***		E300	Rotary Table
	E1		W86 (1902095)		E1	CTS
	E1		W98 (1902369)		E1	GSE J-Box
AGC Calibration Console	E1		Raytheon cable		E1	CTS
AGC 05A7J2	A50 J2	P4	W205 (1020270)*	P1 P2 P3	J4 J5 J6	Buffer Assembly

*NOTE: Do not connect W205 to Buffer Assembly or cable W105 to 56P9. These connections will be made later in accordance with specified procedures.

** System test station only

*** Universal test station only

Installation of PSA End Connector and Cable Harness

4. Remove structural support panels from the G & N Mounting Fixture and retain hardware for use in step B.57. Set G & N Mounting Fixture Cradle to approximately horizontal.

5. Remove all screws holding the End Connector to the PSA End Connector and Cable Harness Handling Fixture.

6. Pick up the PSA End Connector and Cable Harness Handling Fixture and place it as far back as possible in the G & N Mounting Fixture.

7. Release the clamps holding the CDU wire trunk and the DSKY wire trunk.

8. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G & N Mounting Fixture as the PSA End Connector and Harness Trunk Handling Fixture is moved forward. When the End Connector is in its approximate position, set the PSA End Connector and Cable Harness Handling Fixture down.

9. Release all other clamps holding harness trunks.

10. With two men supporting harness trunks and the End Connector, remove the PSA End Connector and Cable Harness Handling Fixture.

11. Place PSA End Connector over mounting holes in G & N Mounting Fixture Cradle.

NOTE: If the alignment
of the PSA Coldplate and
the G & N Mounting Fixture cradle has been
disturbed, it is necessary
to insert the 2 outside screws
(in the row of 4) through
the bottom of the G & N
Mounting Fixture into the
PSA End Connector guide
screw receptacles first.
The remaining 4 screws
are then inserted.

12. Install six 10-32, 1-1/2 inch socket head screws (MS16996-16) and 6 flat washers (AN960C10) to secure the PSA End Connector in the G & N Mounting Fixture Cradle. Torque screws to 20-25 inch-pounds.

13. Secure left D&C Harness Trunk (upper trunk) to left side of G & N Mounting Fixture torquing clamp bolts down snug.

Installation of Optics Navigation Base

14. Insure that the IMU mounting surfaces on the Navigation Base are clean and free of burrs after removing protective pads.

15. Install the Optics Navigation Base Handling Fixture (1901426) to the Navigation Base.

16. Install four eye bolts in the Optics Navigation Base Handling Fixture.

17. Attach the sling to the monorail hoist.

18. Attach the sling to the four eye bolts on the Optics Navigation Base Handling Fixture.

19. Raise the Optics Navigation Base Assembly from its container.

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20. Adjust the sling so that the Optics Navigation Base Assembly is approximately horizontal.

NOTE: Insure Mounting
Pad hardware is not
interchanged.

21. Remove the two upper and one lower pad and ball mount assemblies from the G & N Mounting Fixture.

22. Carefully examine the mating surfaces of the Optics Navigation Base and the ball mount assemblies to insure that they are clean and free of burrs.

23. Attach the ball mount assemblies to the Optics Navigation Base Assembly as illustrated. Tighten the six ball mount bolts finger tight.

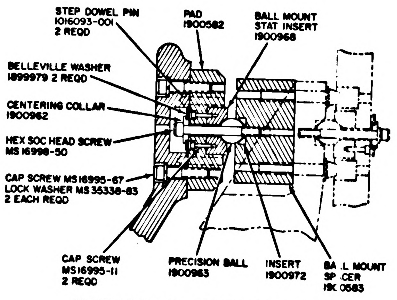
NOTE: A tooling ring or
equivalent may be used to
center the Belleville washers on each other.

24. Taking care to center the Belleville washers, torque the 3 adjusting screws for preloading the kinematic mount balls to 5-7 inch-pounds.

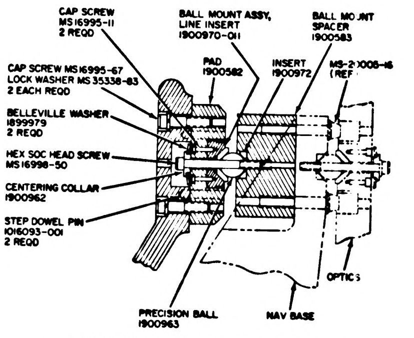
25. Carefully examine the mating surfaces of the mounting pads and the G & N Mounting Fixture frame to insure that they are clean and free from burrs.

26. Slowly and carefully move the Optics Navigation Base Assembly to the correct position over the G & N Mounting Fixture.

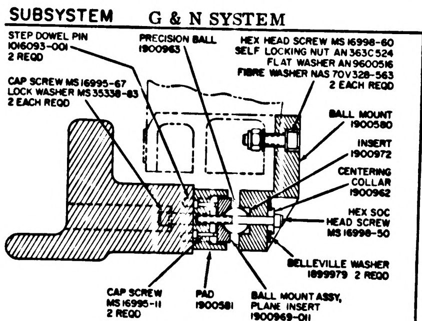
27. Lower the assembly slowly and carefully to its mating position over the G & N Mounting Fixture taking care to avoid interference with the PSA End Connector and Cable Harness.


STEP DOWEL PIN
1016093-001
2 REQD
PAD
1900582
BALL MOUNT
STAT INSERT
1900968
BELLEVILLE WASHER
1899979 2 REQD
CENTERING COLLAR
1900962
HEX SOC HEAD SCREW
MS 16998-50
CAP SCREW MS 16995-67
LOCK WASHER MS 35338-83
2 EACH REQD
CAP SCREW
MS 16995-11
2 REQD
PRECISION BALL
1900963
INSERT
1900972
BALL MOUNT
SPACER
1900583

INSTALLATION OF LEFT MOUNTING PADS
(CROSS-SECTIONAL VIEW)
(HANDWHEEL FACING EAST)
16482-2


CAP SCREW
MS 16995-11
2 REQD
BALL MOUNT ASSY,
LINE INSERT
1900970-011
BALL MOUNT
SPACER
1900583
CAP SCREW MS 16995-67
LOCK WASHER MS 35338-83
2 EACH REQD
PAD
1900582
INSERT
1900972
MS-20006-16
(REF
BELLEVILLE WASHER
1899979
2 REQD
HEX SOC HEAD SCREW
MS 16998-50
CENTERING COLLAR
1900962
STEP DOWEL PIN
1016093-001
2 REQD
OPTICS
PRECISION BALL
1900963
NAV BASE

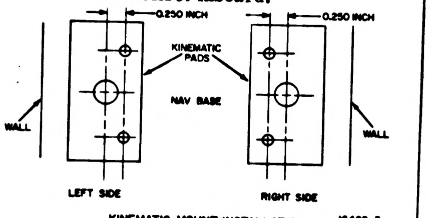
INSTALLATION OF RIGHT MOUNTING PADS
(CROSS-SECTIONAL VIEW)
16482-4


STEP DOWEL PIN
1016093-001
2 REQD
PRECISION BALL
1900963
HEX HEAD SCREW MS 16998-60
SELF LOCKING NUT AN 363C524
FLAT WASHER AN 960C516
FIBRE WASHER NAS 70V328-563
2 EACH REQD
CAP SCREW MS 16995-67
LOCK WASHER MS 35338-83
2 EACH REQD
BALL MOUNT
1900580
INSERT
1900972
CENTERING
COLLAR
1900962
HEX SOC
HEAD SCREW
MS 16998-50
BELLEVILLE WASHER
1899979 2 REQD
CAP SCREW
MS 16995-11
2 REQD
PAD
1900581
BALL MOUNT ASSY,
PLANE INSERT
1900969-011

INSTALLATION OF BOTTOM MOUNTING PAD
(CROSS-SECTIONAL VIEW)
16482-1

28. When the locating pin holes of the 3 kinematic mount pads are lined up with the corresponding pins on the G & N Mounting Fixture complete the lowering of the assembly.

NOTE: Insure right and
left Kinematic Mounts are
positioned with nav base
mounting holes 0.250
inch offset inboard.


0.250 INCH
0.250 INCH
KINEMATIC
PADS
NAV BASE
WALL
WALL
LEFT SIDE
RIGHT SIDE

KINEMATIC MOUNT INSTALLATION
16482-3

29. Install all six kinematic mount pad bolts finger tight.

30. Torque all 12 bolts, 6 for the 3 ball mounts and 6 for the pads, to 90-100 inch-pounds. Tighten the 3 adjusting screws for preloading the kinematic mount balls until centering collar bottoms. Loosen adjusting screws 1/8 turn.

31. Remove the Optics Navigation Base Handling Fixture, P/N 1901426 from the Optics Navigation Base Assembly. Fasten Guard and Seal Assembly to G & N Mounting Fixture. Tighten the 2 screws down snug.

32. Secure left hand IMU Optics Cable Harness to the Optics Navigation Base.

33. Secure right hand IMU Optics Cable Harness to the Optics Navigation Base.

Installation of the IMU

34. Insure that the Portable Temperature Controller is attached to the IMU and is operating properly. See that the extension cable is coiled neatly, with no tangles so that it can be played out smoothly. Allow the IMU outer shell to cool to room temperature for 1 hour before installing in the G & N Mounting Fixture.

35. Attach the four eye bolts to the IMU. Attach the sling to the four eye bolts on the IMU.

36. Carefully hoist the IMU to a convenient level and remove protective mounting pads from the IMU.

37. Thoroughly examine the IMU mounting surfaces to insure that they are clean and free from burrs.

38. Remove protective mounting pads from Optics Navigation Base IMU mounting surfaces. Thoroughly examine the Optics Navigation Base mounting surfaces to insure that they are clean and free from burrs.

39. Remove Snap-On Bellows from IMU.

40. Position the IMU above the G & N Mounting Fixture.

41. Transfer and lower the IMU into position so that the IMU mounting pads are approximately lined up with the Optics Navigation Base mounting pads.

42. Lower the IMU slowly insuring that the guide pins line up with the guide holes on the IMU mounting surface.

43. Lower the IMU into its final position.

44. Remove the sling and eye bolts from the IMU.

45. Torque each of the mounting bolts to 55-60 inch-pounds.

46. Set the tilt axis of the G & N Mounting Fixture to 0° (±1°).

NOTE: Loosen mounting bolts to insure that IMU is resting on alignment pins.

47. Torque the four IMU bolts to 195-200 inch-pounds in 25 inch-pound increments in the following sequence. Torque bolt next to locating pin with circular hole first. Second, torque bolt diagonally across from it. Third, torque bolt next to locating pin with slot. Fourth, torque bolt diagonally across from it.

48. Fasten connector 56P5 on the end of the left hand cable to the Sextant connection 10J1.

49. Fasten connector 56P4 on the end of the left hand cable to the Sextant electronics package connector 10J2. Alternately, tighten each screw two turns until both are torqued down snug.

50. Fasten connector 56P8 on the end of the right hand cable to the Scanning Telescope connector 20J1.

51. Mate the connectors 56P2, 56P7 and 56P3 on cable to IMU connectors 35J1, 35J4 and 35J3.

(NOTE: Connector 35J2 is not mated at this time because heaters must remain attached to power thru the portable temperature controller until power can be supplied by the GSE thru Tray 7 of the PSA.)

52. Connect Flexible Hose Assembly from the IMU Coolant Supply outlet to the inlet valve of the IMU.

NOTE: IMU inlet valve is nearest J3 on IMU.

53. Connect Flexible Hose Assembly from the IMU outlet valve to the IMU Coolant Supply inlet.

Installation of PSA Trays

54. Obtain PSA Trays 1 thru 10 and insert in reverse sequence starting with Tray 10 using left hand to guide rear tongue into its slot and assist in mating the connectors. In turn, engage the captivated screws into toe plate inserts and torque each screw to 15-20 inch-pounds.

55. Mate connector W18-P2 with connector 45A7J2 and W18-P1 with OIA connector J19 torquing the captivated screws to 7-10 inch-pounds.

56. Connect Flexible Hose Assembly from the PSA Coolant Supply to the inlet and exit valves on the PSA cold plate.

Installation of D&C Electronics

57. Obtain D&C Electronics. Position it on the left hand structural support panel so that

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the mounting holes line up with the corresponding insert holes.

58. Insert four screws and torque to 10 inch-pounds in 2 inch-pound increments.

58A. Attach left hand structural support panel to G & N Mounting Fixture using hardware retained in step B.5. Tighten four screws down snug.

59. Mate connector 56P1 to connector 50A3J1 on the D & C Electronics. Torque jacking screw to 5-7 inch-pounds.

Installation of Control Electronics

60. Obtain the Control Electronics Assembly. Position it on the right hand structural support panel so that the mounting holes are aligned. Insert four screws and torque to 10 inch-pounds in 2 inch-pound increments.

61. Attach right hand structural support panel to G & N Mounting Fixture using hardware retained in Step B.5. Tighten four screws down snug.

62. Mate connector 56P10 to connector 50A4J1 on the Control Electronics Assembly. Torque the jacking screw to 5-7 inch-pounds.

Installation of G & N AGC DSKY

63. Install and secure AGC DSKY on upper right frame of G & N Mounting Fixture Cradle. Guide pins will insure proper positioning of DSKY. Torque eight captive bolts to 8-10 inch-pounds.

64. Hold and support 56J10 and screw AGC DSKY connector screw into 56J10 torquing the screw to 5-7 inch-pounds.

65. Secure right D&C Harness Trunk (upper trunk) to right side of G & N Mounting Fixture Cradle torquing the clamp bolt down snug.

Installation of IMU Control Panel

66. Install and secure IMU Control Panel in upper left frame of G & N Mounting Fixture Cradle. Guide pins insure proper position of IMU Control Panel. Torque four captive screws to 8-10 inch-pounds.

67. Hold and support connector 56J6 and screw IMU Control Panel Connector screw into 56J6 torquing it to 5-7 inch-pounds.

Installation of CDU's

68. Install and secure CDU connectors 56J2, 56J1, 56J3, 56J4 and 56J5 in the listed order to the CDU Mounting Frame using special studs P/N 1016889 and flex lock nuts P/N AN365D-440 torqued to 5-7 inch-pounds.

69. Secure upper clamp to the J5, J4 harness and the lower clamp to the J3, J2, J1 harness torquing the clamp bolts down snug.

70. Obtain the five CDU Assemblies and insert them into place in sequence starting with the top and working down. Insure that the correct CDU assemblies are inserted in the correct CDU frame position. Insert the tongue in the slot at the rear and then engage and torque the captivated jacking screws to 35-40 inch-pounds.

71. Obtain the CDU cover panel and fasten it in place over the CDU module boxes

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torquing the 4 captivated screws to 7-10 inch-pounds.

Installation of the Condition Annunciator Assembly

72. Obtain the Condition Annunciator Assembly and secure it to the G & N Mounting Fixture Left Hand Rack Assembly (1901874) using two screws. Torque screws to 7-10 inch-pounds.

73. Mate connector 56J8 to connector P1. Torque the jacking screw to 5-7 inch-pounds.

74. Connect cable W83 P2 to 56P9 and W83 P1 to W96 P4. Connect W96 P5 to Star Simulator J1. Do not connect the other end of cable W96 to OIA connectors J6, J7 and J12 at this time.

Installation of AGC

75. Remove AGC Handling Fixture top cover. Remove terminal of AGC Ground Strap Assembly (P/N 1020276) connected to AGC Handling Fixture. Connect 05A5P4 to Interface Connector J on AGC. Connect W205-P4 (1020270) to 05A7J2 (P50) to AGC. Slide the AGC and cold plate into the G and N Mounting Fixture. Torque the holding screws to 40-50 inch-pounds.

76. Tilt the G and N Mounting Fixture to a convenient position so that the AGC is accessible. Connect AGC Ground Strap Assembly terminal removed in step 75 to ground terminal E2 of G and N Mounting Fixture Cradle.

77. Mate connector 05A5P1 to 56J21, connector 05A5P2 to 56J22, connector 05A5P6 to 56J23, connector 05A5P7 to 56J24, connector 05A5P4 to 05A7J1, and connector 05A5P5 to 05A7J2. Torque the jacking screws finger tight.

78. Connect PSA/AGC/SC Adapter (1020311) to 05A5P3. Tilt G & N Mounting Fixture to approximately 45° taking care not to overstress the cables.

79. Connect the Flexible Hose Ass'y from the AGC coolant supply to the inlet and exit valves of the AGC coldplate.

Installation of Main Panel DSKY

80. Mount the Main Panel DSKY on the stand torquing all screws to 7-10 inch-pounds.

81. Connect W211-P1 to 05A8J1. Torque jacking screw to 7-10 inch-pounds.

Power Turn On of OIA

82. Turn on the following circuit breakers:

CB1	Rear of Oscillograph Console
CB1	Rear of OIA
CB1	Rear of G & N Power and Coolant Console
Circuit Breaker	Front of Guidance System Power Supply panel on G & N Power and Coolant Console
Circuit Breaker	Front of Relay and Lamp Power Supply panel on the OIA

83. Set ICTC POWER SWITCH on BATTERY POWER PACK (1900011) to OFF, if present in the configuration.

84. Set PTC Power Switch to OFF.

85. Remove PTC Power Cable connector P2 from connector J2 on the IMU.

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86. Connect G & N System Harness cable connector 56P6 to connector J2 on the IMU.

87. Apply power to the TEMPERATURE MONITOR CONTROL panel by pressing the 115V 60 cps CONTROL SWITCH.

88. Set the ALARM DISABLE switch on the back of the MONITOR PANEL to ALARM ENABLE. Reset any resulting alarms.

89. Set the MONITOR METER SELECT switch to AUX HTR CURRENT and observe presence of heater current as indicated on the MONITOR METER.

90. Set the MONITOR METER SELECT switch to AUX IRIG and observe that the indicated temperature on the MONITOR METER is within the range of -5 to +5°F.

Installation of Optics Shroud Assembly and Optics Eyepieces

91. Obtain Optics Shroud Assembly and install on G & N Mounting Fixture. Torque all six captive screws to 8-10 inch-pounds.

92. Obtain Optics eyepieces and install on Sextant and Telescope. Tighten both eyepieces down finger tight.

Installation of the G & N Indicator-Control Panel

93. Position the G & N Indicator Control Panel near its mounting surface on the G & N Mounting Fixture. Reach underneath and mate connector 56J9 to connector 50A1P1. Torque jacking screw on the front of the G & N Indicator Control Panel to 5-7 inch-pounds.

94. Mount the G & N Indicator Control Panel insuring that the guide pins enter the guide holes. Torque the captivated screws to 7-10 inch-pounds.

Installation of Tracker X & Y Assembly

95. Install the Tracker X & Y Assembly behind the G & N AGC DSKY on the G & N Mounting Fixture with the four screws.

96. Torque screws to 15-20 inch-pounds.

97. Mate connector 56P13 to connector 45A12J1 on the Tracker X & Y Assembly. Torque the jacking screw to 5-7 inch-pounds.

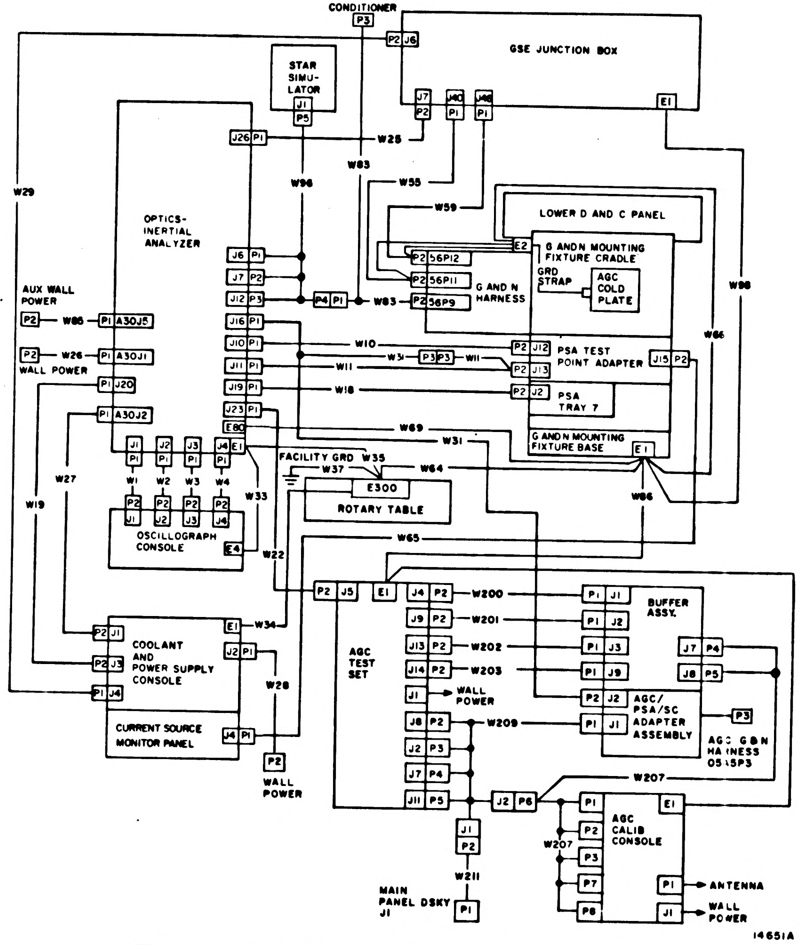
SIGNAL CONDITIONER
P3
GSE JUNCTION BOX
P2 J6
J7 P2
J40 P1
J46 P1
E1
STAR SIMU-LATOR
J1 P5
J26 P1
W25
W83
W96
W55
W59
W29
W98
W66
OPTICS-INERTIAL ANALYZER
LOWER D AND C PANEL
G AND N MOUNTING FIXTURE CRADLE
GRD STRAP
AGC COLD PLATE
E2
P2 56P12
P2 56P11
P2 56P9
G AND N HARNESS
J6 P1
J7 P2
J12 P3
P4 P1
AUX WALL POWER
P2 W86 P1 A30J5
P2 W26 P1 A30J1
WALL POWER
P1 J20
P1 A30J2
J16 P1
J10 P1
J11 P1
J19 P1
J23 P1
E80
W10
W31
P3 P3
W11
W18
PSA TEST POINT ADAPTER
P2 J12
P2 J13
J15 P2
PSA TRAY 7
P2 J2
W69
W31
G AND N MOUNTING FIXTURE BASE
E1
J1 J2 J3 J4 E1
P1 P1 P1 P1
W1 W2 W3 W4
P2 P2 P2 P2
J1 J2 J3 J4
OSCILLOGRAPH CONSOLE
E4
W33
W27
W19
FACILITY GRD
W35
W37
W64
E300
ROTARY TABLE
W86
W65
W22
W34
P2 J5
E1
AGC TEST SET
J4 P2 W200
J9 P2 W201
J13 P2 W202
J14 P2 W203
J1 WALL POWER
J8 P2 W209
J2 P3
J7 P4
J11 P5
BUFFER ASSY.
P1 J1
P1 J2
P1 J3
P1 J9
J7 P4
J8 P5
AGC/PSA/SC ADAPTER ASSEMBLY
P2 J2
P1 J1
P3
AGC G&N HARNESS 05A5P3
W207
COOLANT AND POWER SUPPLY CONSOLE
P2 J1
P2 J3
P1 J4
E1
J2 P1
W28
CURRENT SOURCE MONITOR PANEL
J4 P1
P2
WALL POWER
J2 P6
J1
P2
W211
MAIN PANEL DSKY J1
P1
AGC CALIB CONSOLE
P1 P2 P3 P7 P8
E1
P1 ANTENNA
J1 WALL POWER
W207
14651A

Figure 1. G & N Universal Test Station Cabling Diagram

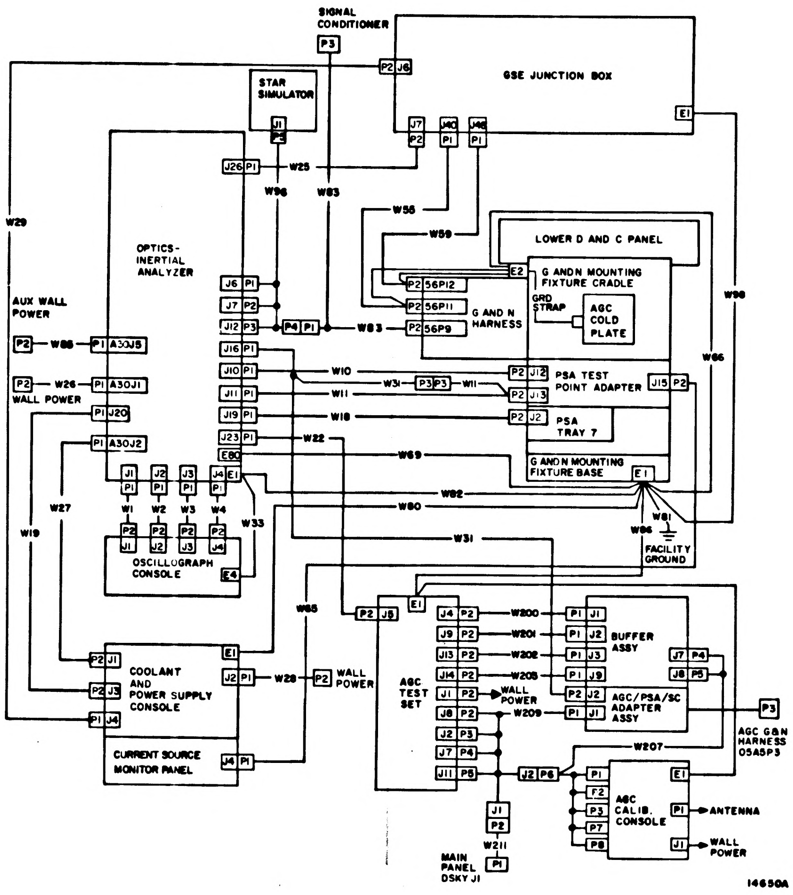
SIGNAL CONDITIONER
P3
GSE JUNCTION BOX
P2 J6
J7 P2
J40 P1
J46 P1
E1
STAR SIMULATOR
J1 P5
J26 P1
W25
W96
W83
W56
W59
W29
W98
W66
OPTICS-INERTIAL ANALYZER
LOWER D AND C PANEL
G AND N MOUNTING FIXTURE CRADLE
GRD STRAP
AGC COLD PLATE
E2
P2 56P12
P2 56P11
P2 56P9
G AND N HARNESS
J6 P1
J7 P2
J12 P3
P4 P1
W83
AUX WALL POWER
P2 W86 P1 A30J5
P2 W26 P1 A30J1
WALL POWER
P1 J20
P1 A30J2
J16 P1
J10 P1
J11 P1
J19 P1
J23 P1
E80
W10
W31
P3 P3
W11
W18
W22
PSA TEST POINT ADAPTER
P2 J12
P2 J13
J15 P2
PSA TRAY 7
P2 J2
W69
G AND N MOUNTING FIXTURE BASE
E1
W82
W80
W81
W86
FACILITY GROUND
W31
J1 J2 J3 J4 E1
P1 P1 P1 P1
W1 W2 W3 W4
P2 P2 P2 P2
J1 J2 J3 J4
OSCILLOGRAPH CONSOLE
E4
W33
W27
W19
W65
P2 J5
E1
AGC TEST SET
J4 P2 W200
J9 P2 W201
J13 P2 W202
J14 P2 W203
J1 P2 WALL POWER
J8 P2 W209
J2 P3
J7 P4
J11 P5
BUFFER ASSY
P1 J1
P1 J2
P1 J3
P1 J9
J7 P4
J8 P5
AGC/PSA/SC ADAPTER ASSY
P2 J2
P1 J1
P3
AGC G&N HARNESS 05A5P3
W207
COOLANT AND POWER SUPPLY CONSOLE
P2 J1
P2 J3
P1 J4
E1
J2 P1
W28
P2 WALL POWER
CURRENT SOURCE MONITOR PANEL
J4 P1
J2 P6
J1
P2
W211
MAIN PANEL DSKY J1
P1
AGC CALIB. CONSOLE
P1 F2 P3 P7 P8
E1
P1 ANTENNA
J1 WALL POWER
14650A

Figure 2. G & N System Test Station Cabling Diagram

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING | **JDC** 10002 **REV.** C **PAGE** 1 **OF** 16
INITIAL TDRR - **D.S. PG 3** -

SUBSYSTEM G & N SYSTEM | **ASSY.**

DESCRIPTION Assembly of Guidance Components into a complete G & N System Test Configuration and preparation of GSE and G & N System for acceptance testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	12-21-65	24814	10	-	WK	-
B	5-6-66	28576	2-5, 7-11	-	MM	ACM
C	7-5-66	30051	2,4,5,10-14	-	MM	-

REFERENCES

IMPORTANT: See below.

INTERVAL

TOOLS AND MATERIAL: See below.

TOOLS AND MATERIAL: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended may be substituted.

Item No.	Number Req'd	Description
1	1 Set	A set of torque wrenches with a range of 1-250 inch pounds with adapters.
2	1	IMU and Optics Navigation Base Ass'y. Sling and Handling Fixture.
3	1	PSA End Connector and Cable Harness Handling Fixture.
4	1	G & N System Equipment #1015000 Dwg.

IMPORTANT: The G & N System must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G & N system and components. Performance of this JDC requires 3 men during steps B.2 through B.51.

A. SAFETY REQUIREMENTS

1. All circuit breakers supplying OIA power to G & N equipment shall be in the OFF position.

2. All signal carrying circuits beginning, terminating, or going thru the G & N equipment shall be de-energized, except for IMU auxiliary temperature control.

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3. All tools shall be in proper operating condition.

4. A thorough visual examination of all equipment shall be performed to detect possible physical damage and to check for sharp edges and abrasion points which could be hazardous to personnel installing G & N equipment as well as to cable bundles, harnesses and connectors.

B. PROCEDURES

NOTE: All directions given are for a technician facing south in front of the G & N Mounting Fixture.

NOTE: Insure that the IMU and AGC cold plate have been purged and filled. If not, refer to JDC 18045 for procedures.

GSE-GSE Preparations

1. Place Prime Power Circuit breaker located on the back of the OIA console to OFF.

2. Mount the AGC Buffer Assembly (1020307) to its mounting frame on the lower front of the G & N Mounting Fixture Cradle. Secure with seven (7) 1/2" 10-24 button head screws (P/N 1006783-38), with seven (7) #10 lockwashers (P/N MS-35338-81).

3. Insure that the following cables are connected. (Exceptions noted) Insure that no other cables between the GSE J-Box and the GSE consoles are connected.

NOTE: The cable interconnections specified to CTS are necessary only when performing JDC's 10034, 10036, or 10039. If these JDC's are not to be performed it is not necessary to make the appropriate cable interconnections to the CTS. When using 100/Block II/ LEM OIA, replace specified cable with cable indicated by †. When using Block II CTS, refer to Table 2 and Figure 3 for cable connections.

Table I

GSE-GSE Interconnections

From	Conn. NO.		Cable and Drawing No.	Conn. No.		To
OIA	J1	P1	W1 (1900886)	P2	J1	Osc. Console
	J2	P1	W2 (1900669)	P2	J2	
	J3	P1	W3 (1900670)	P2	J3	
	J4	P1	W4 (1900671)	P2	J4	
	E1	P1	W33 (1901404)	P2	E4	
	J20	P1	W19 (1900873)	P2	J3	Coolant and Power
	A30J2	P1	W27 (1900871)	P2	J1	Console
	A30J1	P1	W26 (1900921)****	P2		Wall Power
	A30J5	P1	W85 (1901960)****	P2		Aux Wall Power
	J23	P1	W22 (1900959) Δ	P2	J5	CTS
	J26	P1	W25 (1900918)	P2	J7	GSE J Box
	J11	P1	W11 (1900975)*	P2	J13	PSA TPA
				P3	P3	W31
	J10	P1	W10 (1900976)*	P2	J12	PSA TPA
	E80	P1	W69 (1902319) W127 (2900327)†	P2	E1	G & N Fixture Base
	E1		W82 (1901683)**		E1	
	E1	P1	W35 (1901660)*** W127 (2900327)†	P2	E300	Rotary Table
	J6	P1	W96 (1902347)*	P4	P1	W83
	J7	P2				
	J12	P3		P5	J1	Star Simulator (1019883)
	J16	P1	W31 (1901302)*	P2	J2	AGC/PSA/SC Adapter (1020311)

*NOTE: Do not connect cables W10 and W11 to PSA TPA, or cables W31 and W96 to OIA. These cables will be connected later in accordance with specified procedures.

** System test station only

*** Universal test station only

**** Cable W26 must be connected before cable W85.

Δ Not required when using 100/ Block II/ LEM OIA.

Table I (cont)

GSE-GSE Interconnections

From	Conn. No.		Cable and Drawing No.	Conn. No.		To
Coolant and Power Console	J2	P1	W28 (1900872)	P2		Wall power
	J4	P1	W29 (1900879)	P2	J6	GSE J-Box
	E1	P1	W34 (1901614)*** W130 (2900460)†	P2	E300	Rotary Table
	E1		W80 (1901681)**		E1	G & N Fixture Base
Current Source Monitor Panel	J4	P1	W65 (1900739)	P2	J15	PSA TPA
CTS	J4	P2	W200 (1020241)	P1	J1	Buffer Assy. (1020307)
	J9	P2	W201 (1020242-1)	P1	J2	
	J13	P2	W202 (1020242-2)	P1	J3	
	J14	P2	W203 (1020244)	P1	J9	
	J1		Power			Wall power
	J8	P2	W209 (1020284)*	P1	J1	AGC/PSA/SC adapter (1020311)
	J2	P3				
	J7	P4		J1	P2	W211†
	J11	P5		J2	P6	W207
AGC Calibration Console*		P1	W207 (1020253)*	P4	J7	Buffer Assy. (1020307)
		P2		P5	J8	
		P3				

*NOTE: Do not connect cable W65, W209 (to CTS), or W207. These connections will be made later in accordance with specified procedures.

** System Test station only

*** Universal test station only

† W262 is applicable after incorporation of ECP 175

Table I (cont)

GSE-GSE Interconnections						
From	Conn. No.		Cable and Drawing No.	Conn. No.		To
AGC Calibration Console* (cont)		P7 P8	W207 (1020253)*	P6	J2	W209
Facility grd.	E1	P1	W37 (1901662)***	P2	E300	Rotary Table
G and N Fixture Cradle	E2		W66 (1901677)		E1	G and N Fixture Base
G and N Fixture Base	E1		W81 (1901682)**			Facility grd.
	E1		W64 (1901676)***		E300	Rotary Table
	E1		W86 (1902095)		E1	CTS
	E1		W98 (1902369)		E1	GSE J-Box
AGC Calibration Console	E1		Raytheon cable		E1	CTS
AGC 05A7J2	A50	P4	W205 (1020270)*	P1	J4	Buffer Assembly
	J2			P2	J5	
				P3	J6	

*NOTE: Do not connect W205 to Buffer Assembly or cable W105 to 56P9. These connections will be made later in accordance with specified procedures.

** System test station only

*** Universal test station only

Table 2

Block II CTS Connections						
From	Conn. No.		Cable and Drawing No.	Conn. No.		To
CTS	J5	J2	W236 (2014463-011)	P1	J1	Buffer Circuit Assembly
	J11	P2	W237 (2014462-011)	P1	J2	
	J17	P2	W238 (2014462-021)	P1	J3	
	J18	P2	W239 (2014462-031)	P1	J9	
	J9	P3	W234 (2014482-011)	P2		MAIN DSKY
	J7	P4		P1		AGC/PSA/SC Adapter Assy.
	J2	P5				
	J16	P6		P8	P6	W259
	J10	P7				
Buffer Circuit Assembly	J4	P1	W205 (1020270)	P4	A50J2	Test Conn. (AGC)
	J5	P2				
	J6	P3				
	J7	P4	W259 (2014470-011)	P6	P8	W234
	J8	P5		P1	CP1	A1
						Digital Ohmmeter
				P2	HI	(Clock Signal)
				P3	LO	
				P7	HI	
				P8	LO	(Thermistor output)

Installation of PSA End Connector and Cable Harness

4. Remove structural support panels from the G & N Mounting Fixture and retain hardware for use in step B.57. Set G & N Mounting Fixture Cradle to approximately horizontal.

5. Remove all screws holding the End Connector to the PSA End Connector and Cable Harness Handling Fixture.

6. Pick up the PSA End Connector and Cable Harness Handling Fixture and place it as far back as possible in the G & N Mounting Fixture.

7. Release the clamps holding the CDU wire trunk and the DSKY wire trunk.

8. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G & N Mounting Fixture as the PSA End Connector and Harness Trunk Handling Fixture is moved forward. When the End Connector is in its approximate position, set the PSA End Connector and Cable Harness Handling Fixture down.

9. Release all other clamps holding harness trunks.

10. With two men supporting harness trunks and the End Connector, remove the PSA End Connector and Cable Harness Handling Fixture.

11. Place PSA End Connector over mounting holes in G & N Mounting Fixture Cradle.

NOTE: If the alignment of the PSA Coldplate and the G & N Mounting Fixture cradle has been disturbed, it is necessary to insert the 2 outside screws (in the row of 4) through the bottom of the G & N Mounting Fixture into the PSA End Connector guide screw receptacles first. The remaining 4 screws are then inserted.

12. Install six 10-32, 1-1/2 inch socket head screws (MS16996-16) and 6 flat washers (AN960C10) to secure the PSA End Connector in the G & N Mounting Fixture Cradle. Torque screws to 20-25 inch-pounds.

13. Secure left D&C Harness Trunk (upper trunk) to left side of G & N Mounting Fixture torquing clamp bolts down snug.

Installation of Optics Navigation Base

14. Insure that the IMU mounting surfaces on the Navigation Base are clean and free of burrs after removing protective pads.

15. Install the Optics Navigation Base Handling Fixture (1901426) to the Navigation Base.

16. Install four eye bolts in the Optics Navigation Base Handling Fixture.

17. Attach the sling to the monorail hoist.

18. Attach the sling to the four eye bolts on the Optics Navigation Base Handling Fixture.

19. Raise the Optics Navigation Base Assembly from its container.

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20. Adjust the sling so that the Optics Navigation Base Assembly is approximately horizontal.

NOTE: Insure Mounting Pad hardware is not interchanged.

21. Remove the two upper and one lower pad and ball mount assemblies from the G & N Mounting Fixture.

22. Carefully examine the mating surfaces of the Optics Navigation Base and the ball mount assemblies to insure that they are clean and free of burrs.

23. Attach the ball mount assemblies to the Optics Navigation Base Assembly as illustrated. Tighten the six ball mount bolts finger tight.

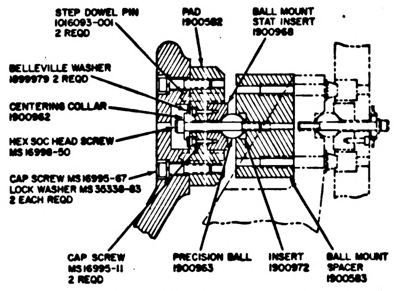
NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

24. Taking care to center the Belleville washers, torque the 3 adjusting screws for preloading the kinematic mount balls to 5-7 inch-pounds.

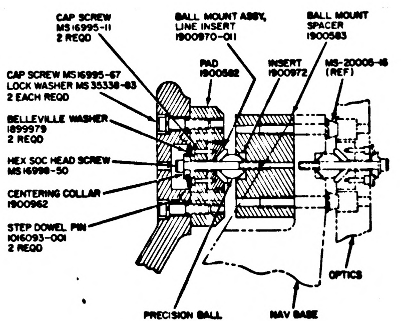
25. Carefully examine the mating surfaces of the mounting pads and the G & N Mounting Fixture frame to insure that they are clean and free from burrs.

26. Slowly and carefully move the Optics Navigation Base Assembly to the correct position over the G & N Mounting Fixture.

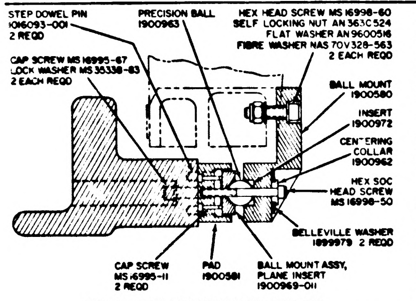
27. Lower the assembly slowly and carefully to its mating position over the G & N Mounting Fixture taking care to avoid interference with the PSA End Connector and Cable Harness.


STEP DOWEL PIN 1016093-001 2 REQD
PAD 1900582
BALL MOUNT STAT INSERT 1900968
BELLEVILLE WASHER 1899979 2 REQD
CENTERING COLLAR 1900962
HEX SOC HEAD SCREW MS16998-50
CAP SCREW MS16995-67 LOCK WASHER MS 35338-83 2 EACH REQD
CAP SCREW MS16995-11 2 REQD
PRECISION BALL 1900963
INSERT 1900972
BALL MOUNT SPACER 1900583

INSTALLATION OF LEFT MOUNTING PADS
(CROSS-SECTIONAL VIEW)
(HANDWHEEL FACING EAST) 16482-2


CAP SCREW MS16995-11 2 REQD
BALL MOUNT ASSY, LINE INSERT 1900970-011
BALL MOUNT SPACER 1900583
PAD 1900582
INSERT 1900972
MS-20006-16 (REF)
CAP SCREW MS16995-67 LOCK WASHER MS 35338-83 2 EACH REQD
BELLEVILLE WASHER 1899979 2 REQD
HEX SOC HEAD SCREW MS16998-50
CENTERING COLLAR 1900962
STEP DOWEL PIN 1016093-001 2 REQD
OPTICS
PRECISION BALL 1900963
NAV BASE

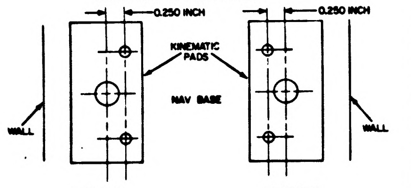
INSTALLATION OF RIGHT MOUNTING PADS
(CROSS-SECTIONAL VIEW) 16482-4



INSTALLATION OF BOTTOM MOUNTING PAD
(CROSS-SECTIONAL VIEW) 16482-1

28. When the locating pin holes of the 3 kinematic mount pads are lined up with the corresponding pins on the G & N Mounting Fixture complete the lowering of the assembly.

NOTE: Insure right and left Kinematic Mounts are positioned with nav base mounting holes 0.250 inch offset inboard.



KINEMATIC MOUNT INSTALLATION 16482-3

29. Install all six kinematic mount pad bolts finger tight.

30. Torque all 12 bolts, 6 for the 3 ball mounts and 6 for the pads, to 90-100 inch-pounds. Tighten the 3 adjusting screws for preloading the kinematic mount balls until centering collar bottoms. Loosen adjusting screws 1/8 turn.

31. Remove the Optics Navigation Base Handling Fixture, P/N 1901426 from the Optics Navigation Base Assembly. Fasten Guard and Seal Assembly to G & N Mounting Fixture. Tighten the 2 screws down snug.

32. Secure left hand IMU Optics Cable Harness to the Optics Navigation Base.

33. Secure right hand IMU Optics Cable Harness to the Optics Navigation Base.

Installation of the IMU

34. Insure that the Portable Temperature Controller is attached to the IMU and is operating properly. See that the extension cable is coiled neatly, with no tangles so that it can be played out smoothly. Allow the IMU outer shell to cool to room temperature for 1 hour before installing in the G & N Mounting Fixture.

35. Attach the four eye bolts to the IMU. Attach the sling to the four eye bolts on the IMU.

36. Carefully hoist the IMU to a convenient level and remove protective mounting pads from the IMU.

37. Thoroughly examine the IMU mounting surfaces to insure that they are clean and free from burrs.

38. Remove protective mounting pads from Optics Navigation Base IMU mounting surfaces. Thoroughly examine the Optics Navigation Base mounting surfaces to insure that they are clean and free from burrs.

39. Remove Snap-On Bellows from IMU.

40. Position the IMU above the G & N Mounting Fixture.

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41. Transfer and lower the IMU into position so that the IMU mounting pads are approximately lined up with the Optics Navigation Base mounting pads.

42. Lower the IMU slowly insuring that the guide pins line up with the guide holes on the IMU mounting surface.

43. Lower the IMU into its final position.

44. Remove the sling and eye bolts from the IMU.

45. Torque each of the mounting bolts to 55-60 inch-pounds.

46. Set the tilt axis of the G & N Mounting Fixture to 0° (±1°).

NOTE: Loosen mounting bolts to insure that IMU is resting on alignment pins.

47. Torque the four IMU bolts to 195-200 inch-pounds in 25 inch-pound increments in the following sequence. Torque bolt next to locating pin with circular hole first. Second, torque bolt diagonally across from it. Third, torque bolt next to locating pin with slot. Fourth, torque bolt diagonally across from it.

48. Fasten connector 56P5 on the end of the left hand cable to the Sextant connection 10J1.

49. Fasten connector 56P4 on the end of the left hand cable to the Sextant electronics package connector 10J2. Alternately, tighten each screw two turns until both are torqued down snug.

50. Fasten connector 56P8 on the end of the right hand cable to the Scanning Telescope connector 20J1.

51. Mate the connectors 56P2, 56P7 and 56P3 on cable to IMU connectors 35J1, 35J4 and 35J3.

(NOTE: Connector 35J2 is not mated at this time because heaters must remain attached to power thru the portable temperature controller until power can be supplied by the GSE thru Tray 7 of the PSA.)

52. Connect Flexible Hose Assembly from the IMU Coolant Supply outlet to the inlet valve of the IMU.

NOTE: IMU inlet valve is nearest J3 on IMU.

53. Connect Flexible Hose Assembly from the IMU outlet valve to the IMU Coolant Supply inlet.

Installation of PSA Trays

54. Obtain PSA Trays 1 thru 10 and insert in reverse sequence starting with Tray 10 using left hand to guide rear tongue into its slot and assist in mating the connectors. In turn, engage the captivated screws into toe plate inserts and torque each screw to 15-20 inch-pounds.

55. Mate connector W18-P2 with connector 45A7J2 and W18-P1 with OIA connector J19 torquing the captivated screws to 7-10 inch-pounds.

56. Connect Flexible Hose Assembly from the PSA Coolant Supply to the inlet and exit valves on the PSA cold plate.

Installation of D&C Electronics

57. Obtain D&C Electronics. Position it on the left hand structural support panel so that

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the mounting holes line up with the corresponding insert holes.

58. Insert four screws and torque to 10 inch-pounds in 2 inch-pound increments.

58A. Attach left hand structural support panel to G & N Mounting Fixture using hardware retained in step B.5. Tighten four screws down snug.

59. Mate connector 56P1 to connector 50A3J1 on the D & C Electronics. Torque jacking screw to 5-7 inch-pounds.

Installation of Control Electronics

60. Obtain the Control Electronics Assembly. Position it on the right hand structural support panel so that the mounting holes are aligned. Insert four screws and torque to 10 inch-pounds in 2 inch-pound increments.

61. Attach right hand structural support panel to G & N Mounting Fixture using hardware retained in Step B.5. Tighten four screws down snug.

62. Mate connector 56P10 to connector 50A4J1 on the Control Electronics Assembly. Torque the jacking screw to 5-7 inch-pounds.

Installation of G & N AGC DSKY

63. Install and secure AGC DSKY on upper right frame of G & N Mounting Fixture Cradle. Guide pins will insure proper positioning of DSKY. Torque eight captive bolts to 8-10 inch-pounds.

64. Hold and support 56J10 and screw AGC DSKY connector screw into 56J10 torquing the screw to 5-7 inch-pounds.

65. Secure right D&C Harness Trunk (upper trunk) to right side of G & N Mounting Fixture Cradle torquing the clamp bolt down snug.

Installation of IMU Control Panel

66. Install and secure IMU Control Panel in upper left frame of G & N Mounting Fixture Cradle. Guide pins insure proper position of IMU Control Panel. Torque four captive screws to 8-10 inch-pounds.

67. Hold and support connector 56J6 and screw IMU Control Panel Connector screw into 56J6 torquing it to 5-7 inch-pounds.

Installation of CDU's

68. Prior to incorporation of ECP 270 perform part a. After incorporation of ECP 270 perform part b.

a. Install and secure CDU connectors 56J2, 56J1, 56J3, 56J4 and 56J5 in the listed order to the CDU Mounting Frame using special studs P/N 1016889 and flex lock nuts P/N AN365D-440 torqued to 5-7 inch-pounds.

b. Install and secure CDU connectors 56J2, 56J1, 56J3, 56J4 and 56J5 in the listed order to the CDU Mounting Frame using Connector Seal (P/N 1902641) (part of CDU Frame Assembly). Use Electrical Connector Installing Tool (P/N 1902586) to position connector.

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69. Secure upper clamp to the J5, J4 harness and the lower clamp to the J3, J2, J1 harness torquing the clamp bolts down snug.

70. Obtain the five CDU Assemblies and insert them into place in sequence starting with the top and working down. Insure that the correct CDU assemblies are inserted in the correct CDU frame position. Insert the tongue in the slot at the rear and then engage and torque the captivated jacking screws to 35-40 inch-pounds.

71. Obtain the CDU cover panel and fasten it in place over the CDU module boxes torquing the 4 captivated screws to 7-10 inch-pounds.

Installation of the Condition Annunciator Assembly

72. Obtain the Condition Annunciator Assembly and secure it to the G & N Mounting Fixture Left Hand Rack Assembly (1901874) using two screws. Torque screws to 7-10 inch-pounds.

73. Mate connector 56J8 to connector P1. Torque the jacking screw to 5-7 inch-pounds.

74. Connect cable W83 P2 to 56P9 and W83 P1 to W96 P4. Connect W96 P5 to Star Simulator J1. Do not connect the other end of cable W96 to OIA connectors J6, J7 and J12 at this time.

Installation of AGC

75. Remove AGC Handling Fixture top cover. Remove terminal of AGC Ground Strap Assembly (P/N 1020276) connected to AGC Handling Fixture. Connect 05A5P4 to Interface Connector J on AGC. Connect W205-P4 (1020270) to 05A7J2 (P50) to AGC. Slide the AGC and cold plate into the G and N Mounting Fixture. Torque the holding screws to 40-50 inch-pounds.

76. Tilt the G and N Mounting Fixture to a convenient position so that the AGC is accessible. Connect AGC Ground Strap Assembly terminal removed in step 75 to ground terminal E2 of G and N Mounting Fixture Cradle.

77. Mate connector 05A5P1 to 56J21, connector 05A5P2 to 56J22, connector 05A5P6 to 56J23, connector 05A5P7 to 56J24, connector 05A5P4 to 05A7J1, and connector 05A5P5 to 05A7J2. Torque the jacking screws finger tight.

78. Connect PSA/AGC/SC Adapter (1020311) to 05A5P3. Tilt G & N Mounting Fixture to approximately 45° taking care not to overstress the cables.

79. Connect the Flexible Hose Ass'y from the AGC coolant supply to the inlet and exit valves of the AGC coldplate.

Installation of Main Panel DSKY

80. Mount the Main Panel DSKY on the stand torquing all screws to 7-10 inch-pounds.

81. Connect W211-P1 to 05A8J1. Torque jacking screw to 7-10 inch-pounds. (Substitute W262 for W211 after incorporation of ECP 175)

Power Turn On of OIA

82. Turn on the following circuit breakers:

CB1	Rear of Oscillograph Console
CB1	Rear of OIA
CB1	Rear of G & N Power and Coolant Console
Circuit Breaker	Front of Guidance System Power Supply panel on G & N Power and Coolant Console
Circuit Breaker	Front of Relay and Lamp Power Supply panel on the OIA

83. Set ICTC POWER SWITCH on BATTERY POWER PACK (1900011) to OFF, if present in the configuration.

84. Set PTC Power Switch to OFF.

85. Remove PTC Power Cable connector P2 from connector J2 on the IMU.

86. Connect G & N System Harness cable connector 56P6 to connector J2 on the IMU.

87. Apply power to the TEMPERATURE MONITOR CONTROL panel by pressing the 115V 60 cps CONTROL SWITCH.

88. Set the ALARM DISABLE switch on the back of the MONITOR PANEL to ALARM ENABLE. Reset any resulting alarms.

89. Set the MONITOR METER SELECT switch to AUX HTR CURRENT and observe presence of heater current as indicated on the MONITOR METER.

90. Set the MONITOR METER SELECT switch to AUX IRIG and observe that the indicated temperature on the MONITOR METER is within the range of -5 to +5°F.

Installation of Optics Shroud Assembly and Optics Eyepieces

91. Obtain Optics Shroud Assembly and install on G & N Mounting Fixture. Torque all six captive screws to 8-10 inch-pounds.

92. Obtain Optics eyepieces and install on Sextant and Telescope. Tighten both eyepieces down finger tight.

Installation of the G & N Indicator-Control Panel

93. Position the G & N Indicator Control Panel near its mounting surface on the G & N Mounting Fixture. Reach underneath and mate connector 56J9 to connector 50A1P1. Torque jacking screw on the front of the G & N Indicator Control Panel to 5-7 inch-pounds.

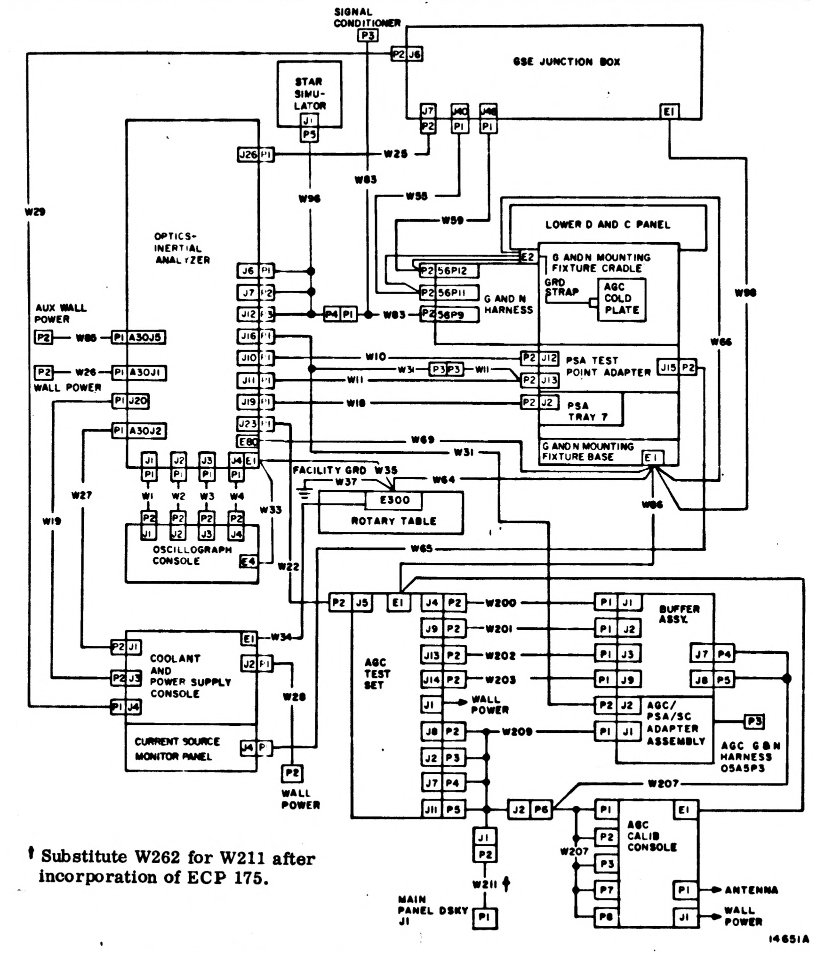
94. Mount the G & N Indicator Control Panel insuring that the guide pins enter the guide holes. Torque the captivated screws to 7-10 inch-pounds.

Installation of Tracker X & Y Assembly

95. Install the Tracker X & Y Assembly behind the G & N AGC DSKY on the G & N Mounting Fixture with the four screws.

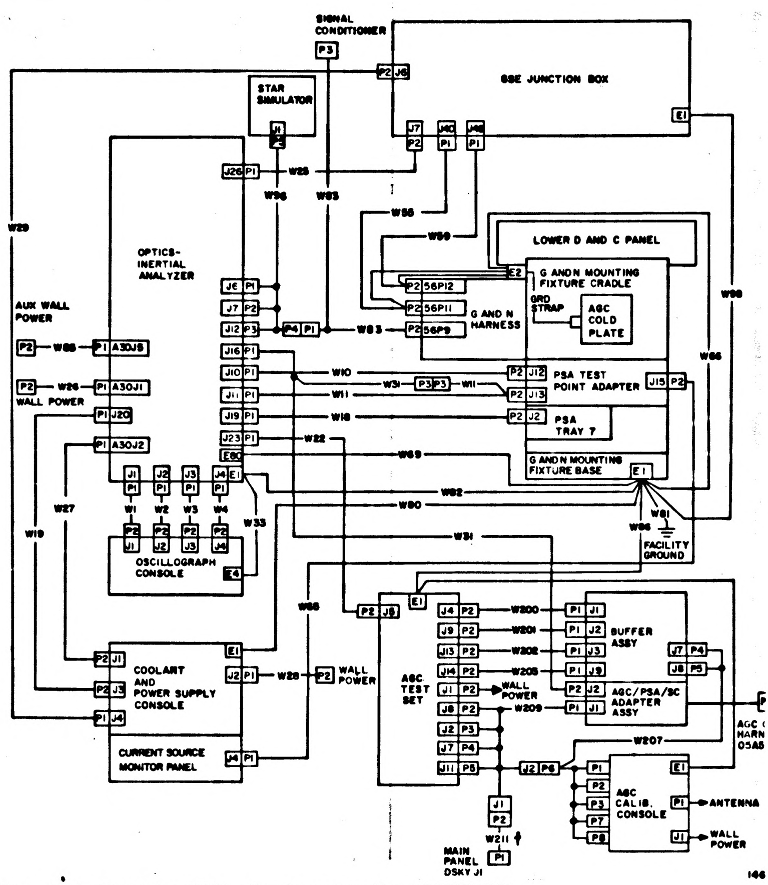
96. Torque screws to 15-20 inch-pounds.

97. Mate connector 56P13 to connector 45A12J1 on the Tracker X & Y Assembly. Torque the jacking screw to 5-7 inch-pounds.


SIGNAL CONDITIONER
GSE JUNCTION BOX
STAR SIMULATOR
OPTICS-INERTIAL ANALYZER
LOWER D AND C PANEL
G AND N MOUNTING FIXTURE CRADLE
GRD STRAP
AGC COLD PLATE
G AND N HARNESS
PSA TEST POINT ADAPTER
PSA TRAY 7
G AND N MOUNTING FIXTURE BASE
AUX WALL POWER
WALL POWER
FACILITY GRD
E300
ROTARY TABLE
OSCILLOGRAPH CONSOLE
COOLANT AND POWER SUPPLY CONSOLE
CURRENT SOURCE MONITOR PANEL
AGC TEST SET
BUFFER ASSY
AGC/PSA/SC ADAPTER ASSEMBLY
AGC G&N HARNESS 0SA5P3
AGC CALIB CONSOLE
MAIN PANEL DSKY J1
ANTENNA
W211 †
14651A

† Substitute W262 for W211 after incorporation of ECP 175.

Figure 1. G & N Universal Test Station Cabling Diagram


SIGNAL CONDITIONER
GSE JUNCTION BOX
STAR SIMULATOR
OPTICS-INERTIAL ANALYZER
LOWER D AND C PANEL
G AND N MOUNTING FIXTURE CRADLE
GRD STRAP
AGC COLD PLATE
G AND N HARNESS
PSA TEST POINT ADAPTER
PSA TRAY 7
G AND N MOUNTING FIXTURE BASE
AUX WALL POWER
WALL POWER
FACILITY GROUND
OSCILLOGRAPH CONSOLE
COOLANT AND POWER SUPPLY CONSOLE
CURRENT SOURCE MONITOR PANEL
AGC TEST SET
BUFFER ASSY
AGC/PSA/SC ADAPTER ASSY
AGC CALIB. CONSOLE
MAIN PANEL DSKY J1
ANTENNA
W211 †

† Substitute W262 for W211 after incorporation of ECP 175.

Figure 2. G & N System Test Station Cabling Diagram

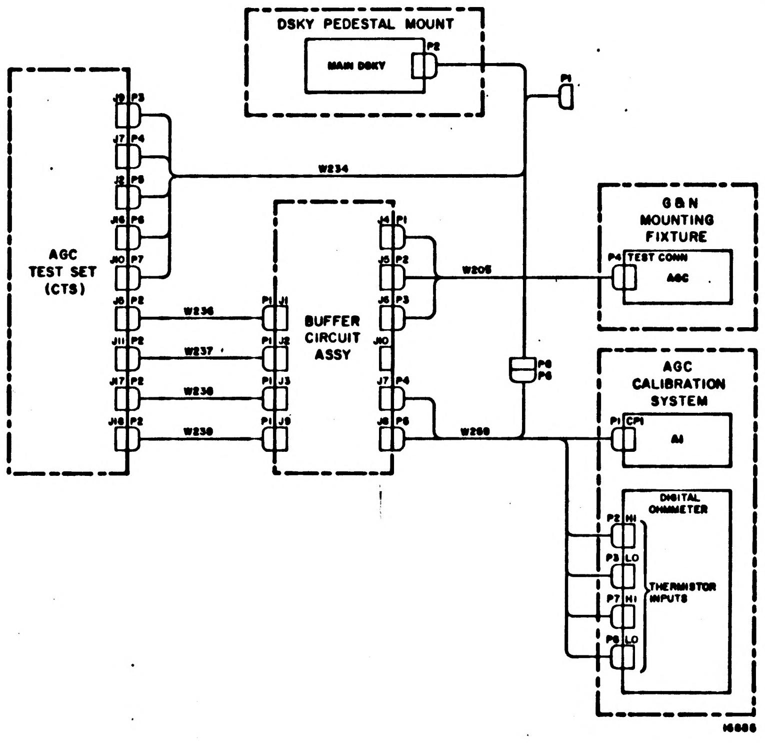

DSKY PEDESTAL MOUNT
MAIN DSKY
AGC TEST SET (CTS)
BUFFER CIRCUIT ASSY
G&N MOUNTING FIXTURE
TEST CONN
AGC
AGC CALIBRATION SYSTEM
AI
DIGITAL OHMMETER
THERMISTOR INPUTS
W234
W205
W236
W237
W238
W239
W299

Figure 3. Block II CTS Cable Connections

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

JDC 10002 **REV.** D **PAGE** 1 **OF** 16

INITIAL TDRR - **D.S. PGS** -

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION Assembly of Guidance Components into a complete G & N System Test Configuration and preparation of GSE and G & N System for acceptance testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	12-21-65	24814	10	-	WK	-
B	5-6-66	28576	2-5, 7-11	-	MM	ACM
C	7-5-66	30051	2,4,5,10-14	-	MM	-
D	10-20-66	31572	7,11,12	-	EA	-

REFERENCES

IMPORTANT: See below.

INTERVAL

TOOLS AND MATERIAL: See below.

TOOLS AND MATERIAL: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended may be substituted.

Item No.	Number Req'd	Description
1	1 Set	A set of torque wrenches with a range of 1-250 inch pounds with adapters.
2	1	IMU and Optics Navigation Base Ass'y. Sling and Handling Fixture.
3	1	PSA End Connector and Cable Harness Handling Fixture.
4	1	G & N System Equipment #1015000 Dwg.

IMPORTANT: The G & N System must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G & N system and components. Performance of this JDC requires 3 men during steps B.2 through B.51.

A. SAFETY REQUIREMENTS

1. All circuit breakers supplying OIA power to G & N equipment shall be in the OFF position.

2. All signal carrying circuits beginning, terminating, or going thru the G & N

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equipment shall be de-energized, except for IMU auxiliary temperature control.

3. All tools shall be in proper operating condition.

4. A thorough visual examination of all equipment shall be performed to detect possible physical damage and to check for sharp edges and abrasion points which could be hazardous to personnel installing G & N equipment as well as to cable bundles, harnesses and connectors.

B. PROCEDURES

NOTE: All directions given are for a technician facing south in front of the G & N Mounting Fixture.

NOTE: Insure that the IMU and AGC cold plate have been purged and filled. If not, refer to JDC 18045 for procedures.

GSE-GSE Preparations

1. Place Prime Power Circuit breaker located on the back of the OIA console to OFF.

2. Mount the AGC Buffer Assembly (1020307) to its mounting frame on the lower front of the G & N Mounting Fixture Cradle. Secure with seven (7) 1/2" 10-24 button head screws (P/N 1006783-38), with seven (7) #10 lockwashers (P/N MS-35338-81).

3. Insure that the following cables are connected. (Exceptions noted) Insure that no other cables between the GSE J-Box and the GSE consoles are connected.

NOTE: The cable interconnections specified to CTS are necessary only when performing JDC's 10034, 10036, or 10039. If these JDC's are not to be performed it is not necessary to make the appropriate cable interconnections to the CTS. When using 100/Block II/ LEM OIA, replace specified cable with cable indicated by †. When using Block II CTS, refer to Table 2 and Figure 3 for cable connections.

Table I

GSE-GSE Interconnections

From	Conn. NO.		Cable and Drawing No.	Conn. No.		To
OIA	J1	P1	W1 (1900886)	P2	J1	Osc. Console
	J2	P1	W2 (1900669)	P2	J2	
	J3	P1	W3 (1900670)	P2	J3	
	J4	P1	W4 (1900671)	P2	J4	
	E1	P1	W33 (1901404)	P2	E4	
	J20	P1	W19 (1900873)	P2	J3	Coolant and Power
	A30J2	P1	W27 (1900871)	P2	J1	Console
	A30J1	P1	W26 (1900921)****	P2		Wall Power
	A30J5	P1	W85 (1901960)****	P2		Aux Wall Power
	J23	P1	W22 (1900959) Δ	P2	J5	CTS
	J26	P1	W25 (1900918)	P2	J7	GSE J Box
	J1I	P1	W11 (1900975)*	P2	J13	PSA TPA
				P3	P3	W31
	J10	P1	W10 (1900976)*	P2	J12	PSA TPA
	E80	P1	W69 (1902319) W127 (2900327)†	P2	E1	G & N Fixture Base
	E1		W82 (1901683)**		E1	
	E1	P1	W35 (1901660)*** W127 (2900327)†	P2	E300	Rotary Table
	J6	P1	W96 (1902347)*	P4	P1	W83
	J7	P2				
	J12	P3		P5	J1	Star Simulator (1019883)
	J16	P1	W31 (1901302)*	P2	J2	AGC/PSA/SC Adapter (1020311)

*NOTE: Do not connect cables W10 and W11 to PSA TPA, or cables W31 and W96 to OIA. These cables will be connected later in accordance with specified procedures.

** System test station only

**** Cable W26 must be connected before cable W85.

*** Universal test station only

Δ Not required when using 100/ Block II/ LEM OIA.

Table I (cont)

GSE-GSE Interconnections

From	Conn. No.		Cable and Drawing No.	Conn. No.		To
Coolant and Power Console	J2	P1	W28 (1900872)	P2		Wall power
	J4	P1	W29 (1900879)	P2	J6	GSE J-Box
	E1	P1	W34 (1901614)*** W130 (2900460)†	P2	E300	Rotary Table
	E1		W80 (1901681)**		E1	G & N Fixture Base
Current Source Monitor Panel	J4	P1	W65 (1900739)	P2	J15	PSA TPA
CTS	J4	P2	W200 (1020241)	P1	J1	Buffer Assy. (1020307)
	J9	P2	W201 (1020242-1)	P1	J2	
	J13	P2	W202 (1020242-2)	P1	J3	
	J14	P2	W203 (1020244)	P1	J9	
	J1		Power			Wall power
	J8	P2	W209 (1020284)*	P1	J1	AGC/PSA/SC adapter (1020311)
	J2	P3				
	J7	P4		J1	P2	W211†
	J11	P5		J2	P6	W207
AGC Calibration Console*		P1	W207 (1020253)*	P4	J7	Buffer Assy. (1020307)
		P2		P5	J8	
		P3				

*NOTE: Do not connect cable W65, W209 (to CTS), or W207. These connections will be made later in accordance with specified procedures.

** System Test station only

*** Universal test station only

† W262 is applicable after incorporation of ECP 175

Table I (cont)

GSE-GSE Interconnections						
From	Conn. No.		Cable and Drawing No.	Conn. No.		To
AGC Calibration Console* (cont)		P7	W207 (1020253)*	P6	J2	W209
		P8				
Facility grd.	E1	P1	W37 (1901662)***	P2	E300	Rotary Table
G and N Fixture Cradle	E2		W66 (1901677)		E1	G and N Fixture Base
G and N Fixture Base	E1		W81 (1901682)**			Facility grd.
	E1		W64 (1901676)***		E300	Rotary Table
	E1		W86 (1902095)		E1	CTS
	E1		W98 (1902369)		E1	GSE J-Box
AGC Calibration Console	E1		Raytheon cable		E1	CTS
AGC 05A7J2	A50	P4	W205 (1020270)*	P1	J4	Buffer Assembly
	J2			P2	J5	
				P3	J6	

*NOTE: Do not connect W205 to Buffer Assembly or cable W105 to 56P9. These connections will be made later in accordance with specified procedures.

** System test station only

*** Universal test station only

Table 2

Block II CTS Connections						
From	Conn. No.		Cable and Drawing No.	Conn. No.		To
CTS	J5	J2	W236 (2014463-011)	P1	J1	Buffer Circuit Assembly
	J11	P2	W237 (2014462-011)	P1	J2	
	J17	P2	W238 (2014462-021)	P1	J3	
	J18	P2	W239 (2014462-031)	P1	J9	
	J9	P3	W234 (2014482-011)	P2		MAIN DSKY
	J7	P4		P1		AGC/PSA/SC Adapter Assy.
	J2	P5				
	J16	P6		P8	P6	W259 **
	J10	P7				
Buffer Circuit Assembly	J4	P1	W205 (1020270)	P4	A50J2	Test Conn. (AGC)
	J5	P2				
	J6	P3				
	J7	P4	W259 (2014470-011)	P6	P8	W234
	J8	P5		P1	CP1	A1
						Digital Ohmmeter
				P2	HI	(Clock Signal)
				P3	LO	
				P7	HI	
				P8	LO	(Thermistor output)

Installation of PSA End Connector and Cable Harness

4. Remove structural support panels from the G & N Mounting Fixture and retain hardware for use in step B.58A. Set G & N Mounting Fixture Cradle to approximately horizontal.

5. Remove all screws holding the End Connector to the PSA End Connector and Cable Harness Handling Fixture.

6. Pick up the PSA End Connector and Cable Harness Handling Fixture and place it as far back as possible in the G & N Mounting Fixture.

7. Release the clamps holding the CDU wire trunk and the DSKY wire trunk.

8. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G & N Mounting Fixture as the PSA End Connector and Harness Trunk Handling Fixture is moved forward. When the End Connector is in its approximate position, set the PSA End Connector and Cable Harness Handling Fixture down.

9. Release all other clamps holding harness trunks.

10. With two men supporting harness trunks and the End Connector, remove the PSA End Connector and Cable Harness Handling Fixture.

11. Place PSA End Connector over mounting holes in G & N Mounting Fixture Cradle.

NOTE: If the alignment of the PSA Coldplate and the G & N Mounting Fixture cradle has been disturbed, it is necessary to insert the 2 outside screws (in the row of 4) through the bottom of the G & N Mounting Fixture into the PSA End Connector guide screw receptacles first. The remaining 4 screws are then inserted.

12. Install six 10-32, 1-1/2 inch socket head screws (MS16996-16) and 6 flat washers (AN960C10) to secure the PSA End Connector in the G & N Mounting Fixture Cradle. Torque screws to 20-25 inch-pounds.

13. Secure left D&C Harness Trunk (upper trunk) to left side of G & N Mounting Fixture torquing clamp bolts down snug.

Installation of Optics Navigation Base

14. Insure that the IMU mounting surfaces on the Navigation Base are clean and free of burrs after removing protective pads.

15. Install the Optics Navigation Base Handling Fixture (1901426) to the Navigation Base.

16. Install four eye bolts in the Optics Navigation Base Handling Fixture.

17. Attach the sling to the monorail hoist.

18. Attach the sling to the four eye bolts on the Optics Navigation Base Handling Fixture.

19. Raise the Optics Navigation Base Assembly from its container.

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20. Adjust the sling so that the Optics Navigation Base Assembly is approximately horizontal.

NOTE: Insure Mounting Pad hardware is not interchanged.

21. Remove the two upper and one lower pad and ball mount assemblies from the G & N Mounting Fixture.

22. Carefully examine the mating surfaces of the Optics Navigation Base and the ball mount assemblies to insure that they are clean and free of burrs.

23. Attach the ball mount assemblies to the Optics Navigation Base Assembly as illustrated. Tighten the six ball mount bolts finger tight.

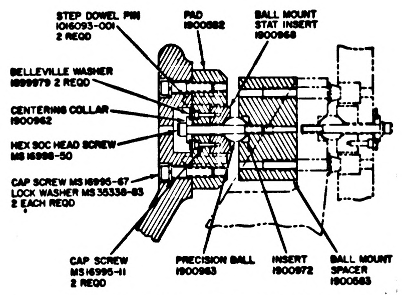
NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

24. Taking care to center the Belleville washers, torque the 3 adjusting screws for preloading the kinematic mount balls to 5-7 inch-pounds.

25. Carefully examine the mating surfaces of the mounting pads and the G & N Mounting Fixture frame to insure that they are clean and free from burrs.

26. Slowly and carefully move the Optics Navigation Base Assembly to the correct position over the G & N Mounting Fixture.

27. Lower the assembly slowly and carefully to its mating position over the G & N Mounting Fixture taking care to avoid interference with the PSA End Connector and Cable Harness.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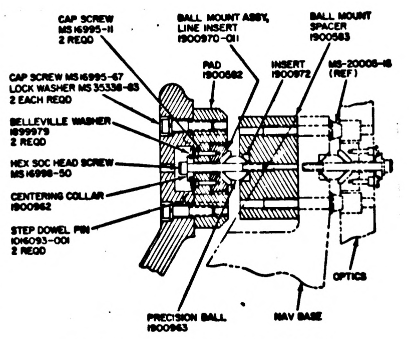
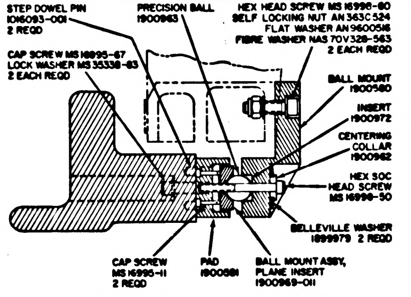
PAD 1900582
BALL MOUNT STAT INSERT 1900968
BELLEVILLE WASHER 1899979 2 REQD
CENTERING COLLAR 1900962
HEX SOC HEAD SCREW MS 16998-50
CAP SCREW MS 16995-67 LOCK WASHER MS 35338-83 2 EACH REQD
CAP SCREW MS16995-11 2 REQD
PRECISION BALL 1900963
INSERT 1900972
BALL MOUNT SPACER 1900583

INSTALLATION OF LEFT MOUNTING PADS
(CROSS-SECTIONAL VIEW)
(HANDWHEEL FACING EAST)
16482-2


CAP SCREW MS16995-11 2 REQD
BALL MOUNT ASSY, LINE INSERT 1900970-011
BALL MOUNT SPACER 1900583
PAD 1900582
INSERT 1900972
MS-20006-16 (REF)
CAP SCREW MS16995-67 LOCK WASHER MS 35338-83 2 EACH REQD
BELLEVILLE WASHER 1899979 2 REQD
HEX SOC HEAD SCREW MS16998-50
CENTERING COLLAR 1900962
STEP DOWEL PIN 1016093-001 2 REQD
OPTICS
PRECISION BALL 1900963
NAV BASE

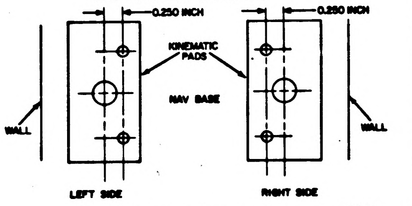
INSTALLATION OF RIGHT MOUNTING PADS
(CROSS-SECTIONAL VIEW)
16482-4



INSTALLATION OF BOTTOM MOUNTING PAD
(CROSS-SECTIONAL VIEW) 16482-1

28. When the locating pin holes of the 3 kinematic mount pads are lined up with the corresponding pins on the G & N Mounting Fixture complete the lowering of the assembly.

NOTE: Insure right and left Kinematic Mounts are positioned with nav base mounting holes 0.250 inch offset inboard.



KINEMATIC MOUNT INSTALLATION 16482-3

29. Install all six kinematic mount pad bolts finger tight.

30. Torque all 12 bolts, 6 for the 3 ball mounts and 6 for the pads, to 90-100 inch-pounds. Tighten the 3 adjusting screws for preloading the kinematic mount balls until centering collar bottoms. Loosen adjusting screws 1/8 turn.

31. Remove the Optics Navigation Base Handling Fixture, P/N 1901426 from the Optics Navigation Base Assembly. Fasten Guard and Seal Assembly to G & N Mounting Fixture. Tighten the 2 screws down snug.

32. Secure left hand IMU Optics Cable Harness to the Optics Navigation Base.

33. Secure right hand IMU Optics Cable Harness to the Optics Navigation Base.

Installation of the IMU

34. Insure that the Portable Temperature Controller is attached to the IMU and is operating properly. See that the extension cable is coiled neatly, with no tangles so that it can be played out smoothly. Allow the IMU outer shell to cool to room temperature for 1 hour before installing in the G & N Mounting Fixture.

35. Attach the four eye bolts to the IMU. Attach the sling to the four eye bolts on the IMU.

36. Carefully hoist the IMU to a convenient level and remove protective mounting pads from the IMU.

37. Thoroughly examine the IMU mounting surfaces to insure that they are clean and free from burrs.

38. Remove protective mounting pads from Optics Navigation Base IMU mounting surfaces. Thoroughly examine the Optics Navigation Base mounting surfaces to insure that they are clean and free from burrs.

39. Remove Snap-On Bellows from IMU.

40. Position the IMU above the G & N Mounting Fixture.

41. Transfer and lower the IMU into position so that the IMU mounting pads are approximately lined up with the Optics Navigation Base mounting pads.

42. Lower the IMU slowly insuring that the guide pins line up with the guide holes on the IMU mounting surface.

43. Lower the IMU into its final position.

44. Remove the sling and eye bolts from the IMU.

45. Torque each of the mounting bolts to 55-60 inch-pounds.

46. Set the tilt axis of the G & N Mounting Fixture to 0° (±1°).

NOTE: Loosen mounting bolts to insure that IMU is resting on alignment pins.

47. Torque the four IMU bolts to 195-200 inch-pounds in 25 inch-pound increments in the following sequence. Torque bolt next to locating pin with circular hole first. Second, torque bolt diagonally across from it. Third, torque bolt next to locating pin with slot. Fourth, torque bolt diagonally across from it.

48. Fasten connector 56P5 on the end of the left hand cable to the Sextant connection 10J1.

49. Fasten connector 56P4 on the end of the left hand cable to the Sextant electronics package connector 10J2. Alternately, tighten each screw two turns until both are torqued down snug.

50. Fasten connector 56P8 on the end of the right hand cable to the Scanning Telescope connector 20J1.

51. Mate the connectors 56P2, 56P7 and 56P3 on cable to IMU connectors 35J1, 35J4 and 35J3.

(NOTE: Connector 35J2 is not mated at this time because heaters must remain attached to power thru the portable temperature controller until power can be supplied by the GSE thru Tray 7 of the PSA.)

52. Connect Flexible Hose Assembly from the IMU Coolant Supply outlet to the inlet valve of the IMU.

NOTE: IMU inlet valve is nearest J3 on IMU.

53. Connect Flexible Hose Assembly from the IMU outlet valve to the IMU Coolant Supply inlet.

Installation of PSA Trays

54. Obtain PSA Trays 1 thru 10 and insert in reverse sequence starting with Tray 10 using left hand to guide rear tongue into its slot and assist in mating the connectors. In turn, engage the captivated screws into toe plate inserts and torque each screw to 15-20 inch-pounds.

55. Mate connector W18-P2 with connector 45A7J2 and W18-P1 with OIA connector J19 torquing the captivated screws to 7-10 inch-pounds.

56. Connect Flexible Hose Assembly from the PSA Coolant Supply to the inlet and exit valves on the PSA cold plate.

Installation of D&C Electronics

57. Obtain D&C Electronics. Position it on the left hand structural support panel so that

the mounting holes line up with the corresponding insert holes.

58. Insert four screws, 1/2-inch, no. 10-32, socket head screws, using a no. 10 lockwasher (MS 35338-81) and a flat round washer (MS 15795-808) under each screw head. Torque each screw to 10-inch-pounds in 2-inch-pound increments.

58A. Attach left hand structural support panel to G & N Mounting Fixture using hardware retained in step B.4. Tighten four screws down snug.

59. Mate connector 56P1 to connector 50A3J1 on the D & C Electronics. Torque jacking screw to 5-7 inch-pounds.

Installation of Control Electronics

60. Obtain the Control Electronics Assembly. Position it on the right hand structural support panel so that the mounting holes are aligned. Insert four 5/8-inch, no. 8-32, socket head screws using two flat round washers (MS 15795-808) under each screw head. Torque each screw to 10-inch-pounds in 2 inch-pound increments.

61. Attach right hand structural support panel to G & N Mounting Fixture using hardware retained in Step B.4. Tighten four screws down snug.

62. Mate connector 56P10 to connector 50A4J1 on the Control Electronics Assembly. Torque the jacking screw to 5-7 inch-pounds.

Installation of G & N AGC DSKY

63. Install and secure AGC DSKY on upper right frame of G & N Mounting Fixture Cradle. Guide pins will insure proper positioning of DSKY. Torque eight captive bolts to 8-10 inch-pounds.

64. Hold and support 56J10 and screw AGC DSKY connector screw into 56J10 torquing the screw to 5-7 inch-pounds.

64A. Secure ground lug E48 under mounting screw of cable clamp closest to connector 56J10.

65. Secure right D&C Harness Trunk (upper trunk) to right side of G & N Mounting Fixture Cradle torquing the clamp bolt down snug.

Installation of IMU Control Panel

66. Install and secure IMU Control Panel in upper left frame of G & N Mounting Fixture Cradle. Guide pins insure proper position of IMU Control Panel. Torque four captive screws to 8-10 inch-pounds.

67. Hold and support connector 56J6 and screw IMU Control Panel Connector screw into 56J6 torquing it to 5-7 inch-pounds.

Installation of CDU's

68. Prior to incorporation of ECP 270 perform part a. After incorporation of ECP 270 perform part b.

a. Install and secure CDU connectors 56J2, 56J1, 56J3, 56J4 and 56J5 in the listed order to the CDU Mounting Frame using special studs P/N 1016889 and flex lock nuts P/N AN365D-440 torqued to 5-7 inch-pounds.

b. Install and secure CDU connectors 56J2, 56J1, 56J3, 56J4 and 56J5 in the listed order to the CDU

Mounting Frame using Connector Seal (P/N 1902641) (part of CDU Frame Assembly). Use Electrical Connector Installing Tool (P/N 1902586) to position connector.

69. Secure upper clamp to the J5, J4 harness and the lower clamp to the J3, J2, J1 harness torquing the clamp bolts down snug.

70. Obtain the five CDU Assemblies and insert them into place in sequence starting with the top and working down. Insure that the correct CDU assemblies are inserted in the correct CDU frame position. Insert the tongue in the slot at the rear and then engage and torque the captivated jacking screws to 35-40 inch-pounds.

71. Obtain the CDU cover panel and fasten it in place over the CDU module boxes torquing the 4 captivated screws to 7-10 inch-pounds.

Installation of Annunciator Panel and Eyepiece Stowage Assembly

72. Obtain the Annunciator Panel and Eyepiece Stowage Assembly and secure it to the G & N Mounting Fixture using four 1/2-inch, no. 10-32, flat countersunk head screws (MS 51960-65). Torque each screw to 7-10 inch-pounds.

73. Mate connector 56J8 to connector P1. Torque the jacking screw to 5-7 inch-pounds.

74. Connect cable W83 P2 to 56P9 and W83 P1 to W96 P4. Connect W96 P5 to Star Simulator J1. Do not connect the other end of cable W96 to OIA connectors J6, J7 and J12 at this time.

Installation of AGC

75. Remove AGC Handling Fixture top cover. Remove terminal of AGC Ground Strap Assembly (P/N 1020276) connected to AGC Handling Fixture. Connect 05A5P4 to Interface Connector J on AGC. Connect W205-P4 (1020270) to 05A7J2 (P50) to AGC. Slide the AGC and cold plate into the G and N Mounting Fixture. Torque the holding screws to 40-50 inch-pounds.

76. Tilt the G and N Mounting Fixture to a convenient position so that the AGC is accessible. Connect AGC Ground Strap Assembly terminal removed in step 75 to ground terminal E2 of G and N Mounting Fixture Cradle.

77. Mate connector 05A5P1 to 56J21, connector 05A5P2 to 56J22, connector 05A5P6 to 56J23, connector 05A5P7 to 56J24, connector 05A5P4 to 05A7J1, and connector 05A5P5 to 05A7J2. Torque the jacking screws finger tight.

78. Connect PSA/AGC/SC Adapter (1020311) to 05A5P3. Tilt G & N Mounting Fixture to approximately 45° taking care not to overstress the cables.

79. Connect the Flexible Hose Ass'y from the AGC coolant supply to the inlet and exit valves of the AGC coldplate.

Installation of Main Panel DSKY

80. Mount the Main Panel DSKY on the stand torquing all screws to 7-10 inch-pounds.

81. Connect W211-P1 to 05A8J1. Torque jacking screw to 7-10 inch-pounds. (Substitute W262 for W211 after incorporation of ECP 175)

Power Turn On of OIA

82. Turn on the following circuit breakers:

CB1	Rear of Oscillograph Console
CB1	Rear of OIA
CB1	Rear of G & N Power and Coolant Console
Circuit Breaker	Front of Guidance System Power Supply panel on G & N Power and Coolant Console
Circuit Breaker	Front of Relay and Lamp Power Supply panel on the OIA

83. Set ICTC POWER SWITCH on BATTERY POWER PACK (1900011) to OFF, if present in the configuration.

84. Set PTC Power Switch to OFF.

85. Remove PTC Power Cable connector P2 from connector J2 on the IMU.

86. Connect G & N System Harness cable connector 56P6 to connector J2 on the IMU.

87. Apply power to the TEMPERATURE MONITOR CONTROL panel by pressing the 115V 60 cps CONTROL SWITCH.

88. Set the ALARM DISABLE switch on the back of the MONITOR PANEL to ALARM ENABLE. Reset any resulting alarms.

89. Set the MONITOR METER SELECT switch to AUX HTR CURRENT and observe presence of heater current as indicated on the MONITOR METER.

90. Set the MONITOR METER SELECT switch to AUX IRIG and observe that the indicated temperature on the MONITOR METER is within the range of -5 to +5°F.

Installation of Optics Shroud Assembly and Optics Eyepieces

91. Obtain Optics Shroud Assembly and install on G & N Mounting Fixture. Torque all six captive screws to 8-10 inch-pounds.

92. Obtain Optics eyepieces and install on Sextant and Telescope. Tighten both eyepieces down finger tight.

Installation of the G & N Indicator-Control Panel

93. Position the G & N Indicator Control Panel near its mounting surface on the G & N Mounting Fixture. Reach underneath and mate connector 56J9 to connector 50A1P1. Torque jacking screw on the front of the G & N Indicator Control Panel to 5-7 inch-pounds.

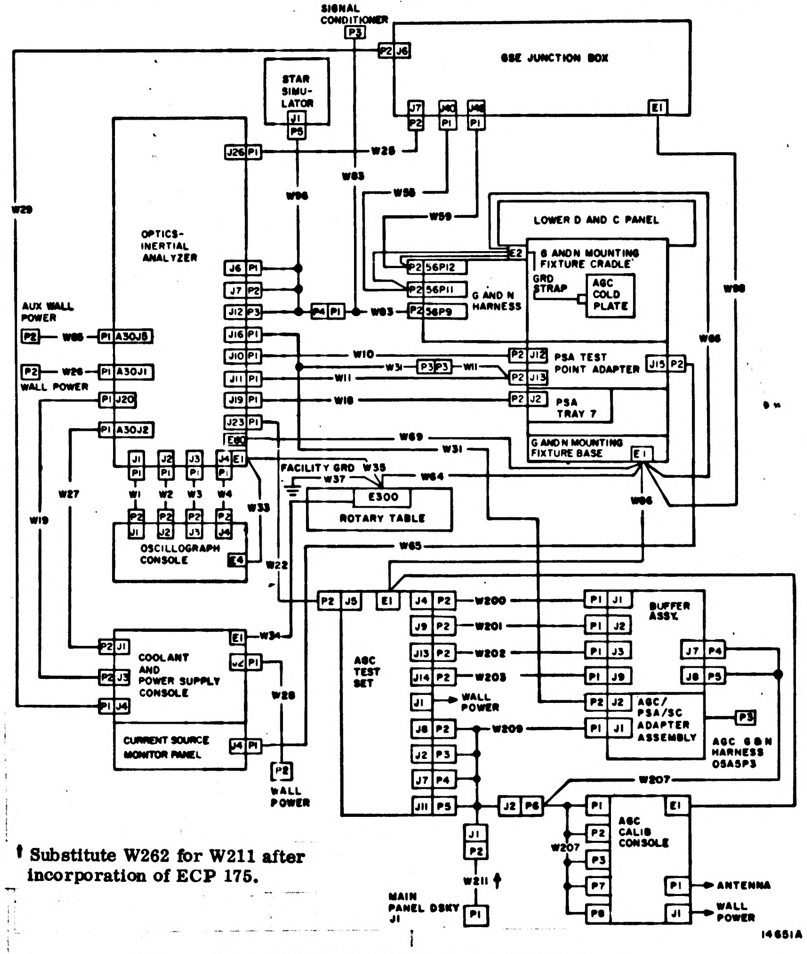
94. Mount the G & N Indicator Control Panel insuring that the guide pins enter the guide holes. Torque the captivated screws to 7-10 inch-pounds.

Installation of Tracker X & Y Assembly

95. Install the Tracker X & Y Assembly behind the G & N AGC DSKY on the G & N Mounting Fixture with the four screws.

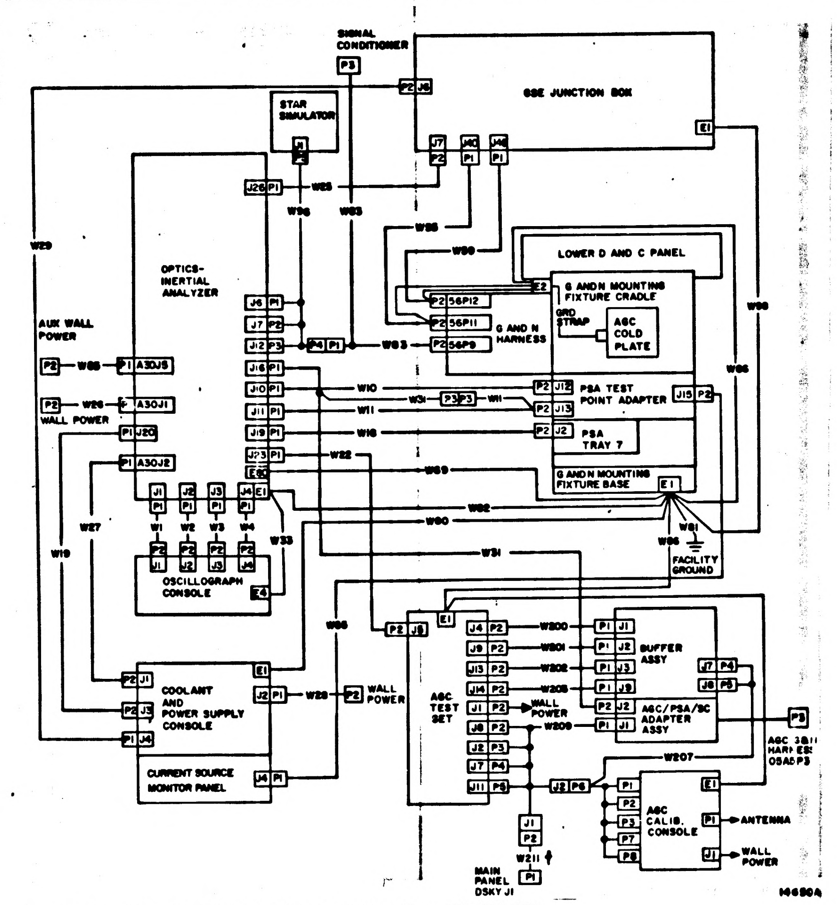
96. Torque screws to 15-20 inch-pounds.

97. Mate connector 56P13 to connector 45A12J1 on the Tracker X & Y Assembly. Torque the jacking screw to 5-7 inch-pounds.


SIGNAL CONDITIONER
GSE JUNCTION BOX
STAR SIMULATOR
OPTICS-INERTIAL ANALYZER
AUX WALL POWER
WALL POWER
LOWER D AND C PANEL
G AND N MOUNTING FIXTURE CRADLE
GRD STRAP
AGC COLD PLATE
G AND N HARNESS
PSA TEST POINT ADAPTER
PSA TRAY 7
G AND N MOUNTING FIXTURE BASE
FACILITY GRD
ROTARY TABLE
E300
OSCILLOGRAPH CONSOLE
COOLANT AND POWER SUPPLY CONSOLE
CURRENT SOURCE MONITOR PANEL
AGC TEST SET
BUFFER ASSY.
AGC/PSA/SC ADAPTER ASSEMBLY
AGC G&N HARNESS 05A5P3
AGC CALIB CONSOLE
ANTENNA
MAIN PANEL DSKY J1
14651A

† Substitute W262 for W211 after incorporation of ECP 175.

Figure 1. G & N Universal Test Station Cabling Diagram


SIGNAL CONDITIONER
GSE JUNCTION BOX
STAR SIMULATOR
OPTICS-INERTIAL ANALYZER
AUX WALL POWER
WALL POWER
LOWER D AND C PANEL
G AND N MOUNTING FIXTURE CRADLE
AGC COLD PLATE
G AND N HARNESS
PSA TEST POINT ADAPTER
PSA TRAY 7
G AND N MOUNTING FIXTURE BASE
FACILITY GROUND
OSCILLOGRAPH CONSOLE
COOLANT AND POWER SUPPLY CONSOLE
CURRENT SOURCE MONITOR PANEL
AGC TEST SET
BUFFER ASSY
AGC/PSA/SC ADAPTER ASSY
AGC CALIB. CONSOLE
ANTENNA
MAIN PANEL DSKY J1

†Substitute W262 for W211 after incorporation of ECP 175.

Figure 2. G & N System Test Station Cabling Diagram

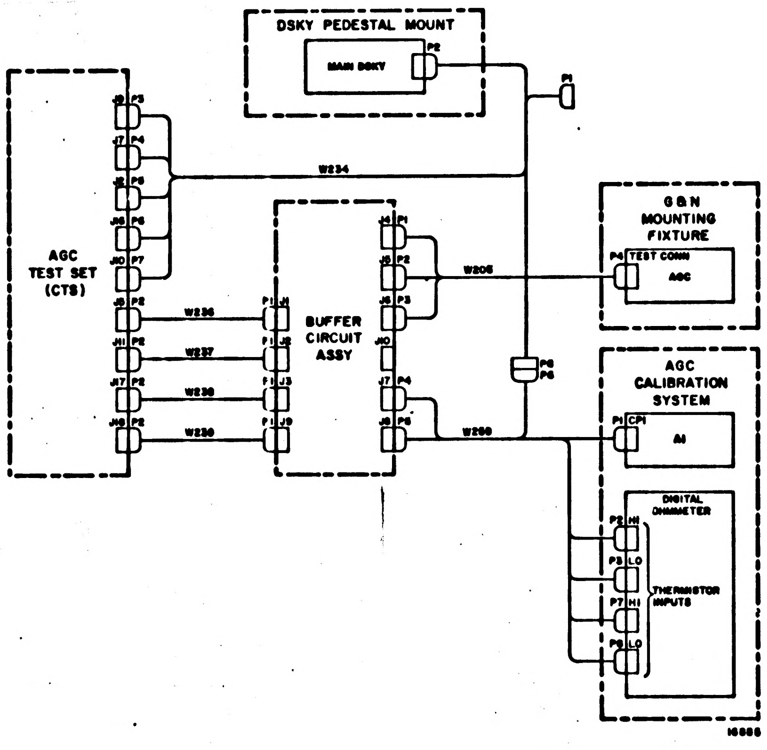

DSKY PEDESTAL MOUNT
MAIN DSKY
AGC TEST SET (CTS)
W234
BUFFER CIRCUIT ASSY
W236
W237
W238
W239
W205
W259
G & N MOUNTING FIXTURE
TEST CONN
AGC
AGC CALIBRATION SYSTEM
AI
DIGITAL OHMMETER
THERMISTOR INPUTS
HI
LO

Figure 3. Block II CTS Cable Connections

TDRR 21539 AUG 12 1965

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING
JDC 10002 REV. - PAGE 1 OF 14
INITIAL TDRR - D.S. PGS -
SUBSYSTEM G & N SYSTEM
ASSY.

DESCRIPTION Assembly of Guidance Components into a complete G & N System Test Configuration and preparation of GSE and G & N System for acceptance testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

IMPORTANT: See below.

INTERVAL

TOOLS AND MATERIAL: See below.

TOOLS AND MATERIAL: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended may be substituted.

Item No.	Number Req'd	Description
1	1 Set	A set of torque wrenches with a range of 1-250 inch pounds with adapters.
2	1	IMU and Optics Navigation Base Ass'y. Sling and Handling Fixture.
3	1	PSA End Connector and Cable Harness Handling Fixture.
4	1	G & N System Equipment #1015000 Dwg.

IMPORTANT: The G & N System must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G & N system and components. Performance of this JDC requires 3 men during steps B.2 through B.51.

A. SAFETY REQUIREMENTS

1. All circuit breakers supplying OIA power to G & N equipment shall be in the OFF position.

2. All signal carrying circuits beginning, terminating, or going thru the G & N

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING
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SUBSYSTEM G & N SYSTEM
ASSY

equipment shall be de-energized, except for IMU auxiliary temperature control.

3. All tools shall be in proper operating condition.

4. A thorough visual examination of all equipment shall be performed to detect possible physical damage and to check for sharp edges and abrasion points which could be hazardous to personnel installing G & N equipment as well as to cable bundles, harnesses and connectors.

B. PROCEDURES

NOTE: All directions given are for a technician facing south in front of the G & N Mounting Fixture.

NOTE: Insure that the IMU and AGC cold plate have been purged and filled. If not, refer to JDC 18045 for procedures.

GSE-GSE Preparations

1. Place Prime Power Circuit breaker located on the back of the OIA console to OFF.

2. Mount the AGC Buffer Assembly (1020307) to its mounting frame on the lower front of the G & N Mounting Fixture Cradle. Secure with seven (7) 1/2" 10-24 button head screws (P/N 1006783-38), with seven (7) #10 lockwashers (P/N MS-35338-81).

3. Insure that the following cables are connected. (Exceptions noted) Insure that no other cables between the GSE J-Box and the GSE consoles are connected.

NOTE: The cable interconnections specified to CTS are necessary only when performing JDC's 10034, 10036, or 10039. If these JDC's are not to be performed it is not necessary to make the appropriate cable interconnections to the CTS.

DATE ______

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING
JDC 10002 REV - PAGE 3 OF 14
SUBSYSTEM G & N SYSTEM
ASSY

Table I

GSE-GSE Interconnections

From	Conn. NO.		Cable and Drawing NO.	Conn. NO.		To
OIA	J1	P1	W1 (1900886)	P2	J1	Osc. Console
	J2	P1	W2 (1900669)	P2	J2	
	J3	P1	W3 (1900670)	P2	J3	
	J4	P1	W4 (1900671)	P2	J4	
	E1		W33 (1901404)		E4	
	J20	P1	W19 (1900873)	P2	J3	Coolant and Power
	A30J2	P1	W27 (1900871)	P2	J1	Console
	A30J1	P1	W26 (1900921)****	P2		Wall Power
	A30J5	P1	W85 (1901960)****	P2		Aux Wall Power
	J23	P1	W22 (1900959)	P2	J5	CTS
	J26	P1	W25 (1900918)	P2	J7	GSE J Box
	J11	P1	W11 (1900975)*	P2	J13	PSA TPA
				P3	P3	W31
	J10	P1	W10 (1900976)*	P2	J12	PSA TPA
	E80		W69 (1902319)		E1	G & N Fixture
	E1		W82 (1901683)**		E1	Base
	E1		W35 (1901660)***		E300	Rotary Table
	J6	P1	W96 (1902347)*	P4	P1	W83
	J7	P2				
	J12	P3		P5	J1	Star Simulator (1019883)
	J16	P1	W31 (1901302)*	P2	J2	AGC/PSA/SC Adapter (1020311)
				P3	P3	W11

*NOTE: Do not connect cables W10 and W11 to PSA TPA, or cables W31 and W96 to OIA. These cables will be connected later in accordance with specified procedures.
** System test station only
*** Universal test station only
**** Cable W26 must be connected before cable W85.

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING
JDC 10002 REV - PAGE 4 OF 14
SUBSYSTEM G & N SYSTEM
ASSY

Table I (cont)

GSE-GSE Interconnections

From	Conn. NO.		Cable and Drawing NO.	Conn. NO.		To
Coolant and Power Console	J2	P1	W28 (1900872)	P2		Wall power
	J4	P1	W29 (1900879)	P2	J6	GSE J-Box
	E1		W34 (1901614)***		E300	Rotary Table
	E1		W80 (1901681)**		E1	G & N Fixture Base
Current Source Monitor Panel	J4	P1	W65 (1900739)	P2	J15	PSA TPA
CTS	J4	P2	W200 (1020241)	P1	J1	Buffer Assy. (1020307)
	J9	P2	W201 (1020242-1)	P1	J2	
	J13	P2	W202 (1020242-2)	P1	J3	
	J14	P2	W203 (1020244)	P1	J9	
	J1		Power			Wall power
	J8	P2	W209 (1020284)*	P1	J1	AGC/PSA/SC adapter (1020311)
	J2	P3				
	J7	P4		J1	P2	W211
	J11	P5		J2	P6	W211
AGC Calibration Console*		P1	W207 (1020253)*	P4	J7	Buffer Assy. (1020307)
		P2		P5	J8	
		P3				

*NOTE: Do not connect cable W65, W209 (to CTS), or W207. These connections will be made later in accordance with specified procedures.
** System Test station only
*** Universal test station only

DATE ______

Table I (cont)

GSE-GSE Interconnections						
FROM	Conn. NO.		Cable and Drawing NO.	Conn. NO.		To
AGC Calibration Console* (cont)		P7 P8	W207 (1020253)*	P6	J2	W209
Facility grd.			W37 (1901662)***			
G and N Fixture Cradle	E2		W66 (1901677)		E1	G and N Fixture Base
G and N Fixture Base	E1		W81 (1901682)**			Facility grc.
	E1		W64 (1901676)***		E300	Rotary Table
	E1		W86 (1902095)		E1	CTS
	E1		W98 (1902369)		E1	GSE J-Box
AGC Calibration Console	E1		Raytheon cable		E1	CTS
AGC 05A7J2	A50 J2	P4	W205 (1020270)*	P1 P2 P3	J4 J5 J6	Buffer Assembly

*NOTE: Do not connect W205 to Buffer Assembly or cable W105 to 56P9. These connections will be made later in accordance with specified procedures.

** System test station only

*** Universal test station only

DATE ________

Installation of PSA End Connector and Cable Harness

4. Remove structural support panels from the G & N Mounting Fixture and retain hardware for use in step B.57. Set G & N Mounting Fixture Cradle to approximately horizontal.

5. Remove all screws holding the End Connector to the PSA End Connector and Cable Harness Handling Fixture.

6. Pick up the PSA End Connector and Cable Harness Handling Fixture and place it as far back as possible in the G & N Mounting Fixture.

7. Release the clamps holding the CDU wire trunk and the DSKY wire trunk.

8. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G & N Mounting Fixture as the PSA End Connector and Harness Trunk Handling Fixture is moved forward. When the End Connector is in its approximate position, set the PSA End Connector and Cable Harness Handling Fixture down.

9. Release all other clamps holding harness trunks.

10. With two men supporting harness trunks and the End Connector, remove the PSA End Connector and Cable Harness Handling Fixture.

11. Place PSA End Connector over mounting holes in G & N Mounting Fixture Cradle.

NOTE: If the alignment of the PSA Coldplate and the G & N Mounting Fixture cradle has been disturbed, it is necessary to insert the 2 outside screws (in the row of 4) through the bottom of the G & N Mounting Fixture into the PSA End Connector guide screw receptacles first. The remaining 4 screws are then inserted.

12. Install six 10-32, 1-1/2 inch socket head screws (MS16996-16) and 6 flat washers (AN960C10) to secure the PSA End Connector in the G & N Mounting Fixture Cradle. Torque screws to 20-25 inch-pounds.

13. Secure left D&C Harness Trunk (upper trunk) to left side of G & N Mounting Fixture torquing clamp bolts down snug.

Installation of Optics Navigation Base

14. Insure that the IMU mounting surfaces on the Navigation Base are clean and free of burrs after removing protective pads.

15. Install the Optics Navigation Base Handling Fixture (1901426) to the Navigation Base.

16. Install four eye bolts in the Optics Navigation Base Handling Fixture.

17. Attach the sling to the monorail hoist.

18. Attach the sling to the four eye bolts on the Optics Navigation Base Handling Fixture.

19. Raise the Optics Navigation Base Assembly from its container.

DATE ________

20. Adjust the sling so that the Optics Navigation Base Assembly is approximately horizontal.

21. Remove the two upper and one lower pad and ball mount assemblies from the G & N Mounting Fixture.

22. Carefully examine the mating surfaces of the Optics Navigation Base and the ball mount assemblies to insure that they are clean and free of burrs.

23. Attach the ball mount assemblies to the Optics Navigation Base Assembly as illustrated. Tighten the six ball mount bolts finger tight.

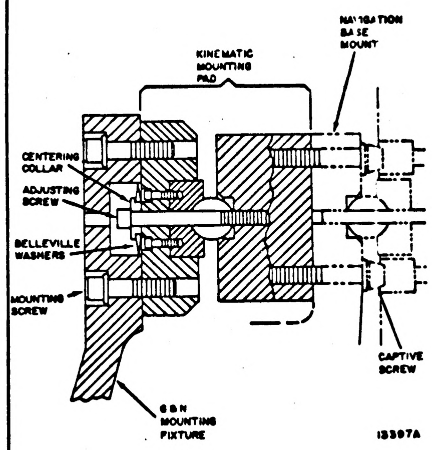
NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

24. Taking care to center the Belleville washers, torque the 3 adjusting screws for preloading the kinematic mount balls to 5-7 inch-pounds.

25. Carefully examine the mating surfaces of the mounting pads and the G & N Mounting Fixture frame to insure that they are clean and free from burrs.

26. Slowly and carefully move the Optics Navigation Base Assembly to the correct position over the G & N Mounting Fixture.

27. Lower the assembly slowly and carefully to its mating position over the G & N Mounting Fixture taking care to avoid interference with the PSA End Connector and Cable Harness.



Installation of Mounting Pads
(Cross-Sectional View)

28. When the locating pin holes of the 3 kinematic mount pads are lined up with the corresponding pins on the G & N Mounting Fixture complete the lowering of the assembly.

29. Install all six kinematic mount pad bolts finger tight.

30. Torque all 12 bolts, 6 for the 3 ball mounts and 6 for the pads, to 90-100 inch-pounds. Tighten the 3 adjusting screws for preloading the kinematic mount balls until centering collar bottoms. Loosen adjusting screws 1/8 turn.

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31. Remove the Optics Navigation Base Handling Fixture, P/N 1901426 from the Optics Navigation Base Assembly. Fasten Guard and Seal Assembly to G & N Mounting Fixture. Tighten the 2 screws down snug.

32. Secure left hand IMU Optics Cable Harness to the Optics Navigation Base.

33. Secure right hand IMU Optics Cable Harness to the Optics Navigation Base.

Installation of the IMU

34. Insure that the Portable Temperature Controller is attached to the IMU and is operating properly. See that the extension cable is coiled neatly, with no tangles so that it can be played out smoothly. Allow the IMU outer shell to cool to room temperature for 1 hour before installing in the G & N Mounting Fixture.

35. Attach the four eye bolts to the IMU. Attach the sling to the four eye bolts on the IMU.

36. Carefully hoist the IMU to a convenient level and remove protective mounting pads from the IMU.

37. Thoroughly examine the IMU mounting surfaces to insure that they are clean and free from burrs.

38. Remove protective mounting pads from Optics Navigation Base IMU mounting surfaces. Thoroughly examine the Optics Navigation Base mounting surfaces to insure that they are clean and free from burrs.

39. Remove Snap-On Bellows from IMU.

40. Position the IMU above the G & N Mounting Fixture.

41. Transfer and lower the IMU into position so that the IMU mounting pads are approximately lined up with the Optics Navigation Base mounting pads.

42. Lower the IMU slowly insuring that the guide pins line up with the guide holes on the IMU mounting surface.

43. Lower the IMU into its final position.

44. Remove the sling and eye bolts from the IMU.

45. Torque each of the mounting bolts to 55-60 inch-pounds.

46. Set the tilt axis of the G & N Mounting Fixture to 0° (±1°).

NOTE: Loosen mounting bolts to insure that IMU is resting on alignment pins.

47. Torque the four IMU bolts to 195-200 inch-pounds in 25 inch-pound increments in the following sequence. Torque bolt in hole with locating pin first. Second torque bolt diagonally across from it. Third torque bolt in the slot. Fourth torque bolt diagonally across from it.

48. Fasten connector 56P5 on the end of the left hand cable to the Sextant connection 10J1.

49. Fasten connector 56P4 on the end of the left hand cable to the Sextant electronics package connector 10J2. Alternately, tighten each screw two turns until both are torqued down snug.

50. Fasten connector 56P8 on the end of the right hand cable to the Scanning Telescope connector 20J1.

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51. Mate the connectors 56P2, 56P7 and 56P3 on cable to IMU connectors 35J1, 35J4 and 35J3.

(NOTE: Connector 35J2 is not mated at this time because heaters must remain attached to power thru the portable temperature controller until power can be supplied by the GSE thru Tray 7 of the PSA.)

52. Connect Flexible Hose Assembly from the IMU Coolant Supply outlet to the inlet valve of the IMU.

53. Connect Flexible Hose Assembly from the IMU outlet valve to the IMU Coolant Supply inlet.

Installation of PSA Trays

54. Obtain PSA Trays 1 thru 10 and insert in reverse sequence starting with Tray 10 using left hand to guide rear tongue into its slot and assist in mating the connectors. In turn, engage the captivated screws into toe plate inserts and torque each screw to 15-20 inch-pounds.

55. Mate connector W18-P2 with connector 45A7J2 and W18-P1 with OIA connector J19 torquing the captivated screws to 7-10 inch-pounds.

56. Connect Flexible Hose Assembly from the PSA Coolant Supply to the inlet and exit valves on the PSA cold plate.

Installation of D&C Electronics

57. Attach structural support panel to G & N Mounting Fixture using hardware retained in step B-4. Tighten eight (8) screws down snug. Obtain D&C Electronics. Position it so that the mounting holes line up with the corresponding insert holes in the left hand structural support panel.

58. Insert four screws and torque them to 10 inch-pounds in 2 inch-pound increments.

59. Mate connector 56P1 to connector 50A3J1 on the D&C Electronics. Torque jacking screw to 5-7 inch-pounds.

Installation of Control Electronics

60. Obtain the Control Electronics Assembly and mount it on the right hand structural support with the four screws.

61. Torque the screws to 10 inch-pounds in 2 inch-pound increments.

62. Mate connector 56P10 to connector 50A4J1 on the Control Electronics Assembly. Torque the jacking screw to 5-7 inch-pounds.

Installation of G & N AGC DSKY

63. Install and secure AGC DSKY on upper right frame of G & N Mounting Fixture Cradle. Guide pins will insure proper positioning of DSKY. Torque eight captive bolts to 8-10 inch-pounds.

64. Hold and support 56J10 and screw AGC DSKY connector screw into 56J10 torquing the screw to 5-7 inch-pounds.

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65. Secure right D&C Harness Trunk (upper trunk) to right side of G & N Mounting Fixture Cradle torquing the clamp bolt down snug.

Installation of IMU Control Panel

66. Install and secure IMU Control Panel in upper left frame of G & N Mounting Fixture Cradle. Guide pins insure proper position of IMU Control Panel. Torque four captive screws to 8-10 inch-pounds.

67. Hold and support connector 56J6 and screw IMU Control Panel Connector screw into 56J6 torquing it to 5-7 inch-pounds.

Installation of CDU's

68. Install and secure CDU connectors 56J1, 56J2, 56J3, 56J4 and 56J5 in the listed order to the CDU Mounting Frame using special studs P/N 1016889 and flex lock nuts P/N AN365D-440 torqued to 5-7 inch-pounds.

69. Secure upper clamp to the J5, J4 harness and the lower clamp to the J3, J2, J1 harness torquing the clamp bolts down snug.

70. Obtain the five CDU Assemblies and insert them into place in sequence starting with the top and working down. Insure that the correct CDU assemblies are inserted in the correct CDU frame position. Insert the tongue in the slot at the rear and then engage and torque the captivated jacking screws to 35-40 inch-pounds.

71. Obtain the CDU cover panel and fasten it in place over the CDU module boxes torquing the 4 captivated screws to 7-10 inch-pounds.

Installation of the Condition Annunciator Assembly

72. Obtain the Condition Annunciator Assembly and secure it to the G & N Mounting Fixture. Torque all four screws to 7-10 inch-pounds.

73. Mate connector 56J8 to connector P1. Torque the jacking screw to 5-7 inch-pounds.

74. Connect cable W83 P2 to 56P9 and W83 P1 to W96 P4. Connect W96 P5 to Star Simulator J1. Do not connect the other end of cable W96 to OIA connectors J6, J7 and J12 at this time.

Installation of AGC

75. Remove AGC Handling Fixture top cover. Remove terminal of AGC Ground Strap Assembly (P/N 1020276) connected to the side of AGC Handling Fixture. Connect 05A5P4 to Interface Connector J on AGC. Slide the AGC and cold plate into the G and N Mounting Fixture. Torque the holding screws to 40-50 inch-pounds.

76. Tilt the G and N Mounting Fixture to a convenient position so that the AGC is accessible. Connect AGC Ground Strap Assembly terminal removed in step 75 to ground terminal E2 of G and N Mounting Fixture Cradle.

77. Mate connector 05A5P1 to 56J21, connector 05A5P2 to 56J22, connector 05A5P6 to 56J23, connector 05A5P7 to 56J24, connector 05A5P4 to 05A7J1, and connector 05A5P5

DATE ________

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to 05A7J2. Torque the jacking screws finger tight.

78. Connect PSA/AGC/SC Adapter (1020311) to 05A5P3 of AGC and connect W205-P4 (1020270) to 05A7J2 (A50) of AGC. Tilt G & N Mounting Fixture to approximately 0°.

79. Connect the Flexible Hose Ass'y from the AGC coolant supply to the inlet and exit valves of the AGC coldplate.

Installation of Main Panel DSKY

80. Mount the Main Panel DSKY on the stand torquing all screws to 7-10 inch-pounds.

81. Connect W211-P1 to 05A8J1. Torque jacking screw to 7-10 inch-pounds.

Power Turn On of OIA

82. Place the Prime Power Circuit Breakers on the back of the OIA Coolant Supply and Oscillograph Consoles to ON.

83. Set ICTC POWER SWITCH on BATTERY POWER PACK (1900011) to OFF, if present in the configuration.

84. Set PTC Power Switch to OFF.

85. Remove PTC Power Cable connector P2 from connector J2 on the IMU.

86. Connect G & N System Harness cable connector 56P6 to connector J2 on the IMU.

87. Apply power to the TEMPERATURE MONITOR CONTROL panel by pressing the 115V 60 cps CONTROL SWITCH.

88. Set the ALARM DISABLE switch on the back of the MONITOR PANEL to ALARM ENABLE.

89. Set the MONITOR METER SELECT switch to AUX HTR CURRENT and observe presence of heater current as indicated on the MONITOR METER.

90. Set the MONITOR METER SELECT switch to AUX IRIG and observe that the indicated temperature on the MONITOR METER is within the range of -5 to +5° F.

Installation of Optics Shroud Assembly and Optics Eyepieces

91. Obtain Optics Shroud Assembly and install on G & N Mounting Fixture. Torque all six captive screws to 8-10 inch-pounds.

92. Obtain Optics eyepieces and install on Sextant and Telescope. Tighten both eyepieces down finger tight.

Installation of the G & N Indicator-Control Panel

93. Position the G & N Indicator Control Panel near its mounting surface on the G & N Mounting Fixture. Reach underneath and mate connector 56J9 to connector 50A1P1. Torque jacking screw on the front of the G & N Indicator Panel to 5-7 inch-pounds.

94. Mount the G & N Indicator Control Panel insuring that the guide pins enter the guide holes. Torque the captivated screws to 7-10 inch-pounds.

Installation of Tracker X & Y Assembly

95. Install the Tracker X & Y Assembly behind the G & N AGC DSKY on the G & N

DATE ________

Mounting Fixture with the four screws.

96. Torque screws to 15-20 inch-pounds.

97. Mate connector 56P13 to connector 45A12J1 on the Tracker X & Y Assembly. Torque the jacking screw to 5-7 inch-pounds.

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING | JDC 10002 REV - PAGE 13 OF 14

SUBSYSTEM G & N SYSTEM | ASSY

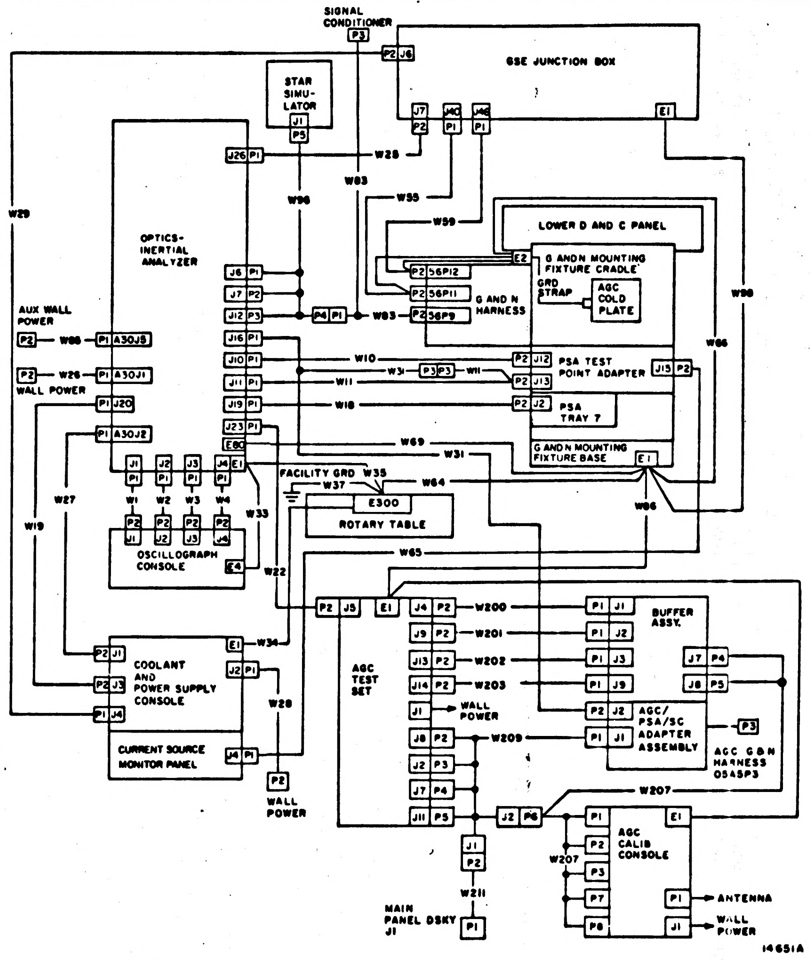
SIGNAL CONDITIONER
P3
P2 J6
GSE JUNCTION BOX
J7 P2
J40 P1
J46 P1
E1
STAR SIMU-LATOR
J1
P5
J26 P1
W25
W83
W96
W55
W59
W29
OPTICS-INERTIAL ANALYZER
LOWER D AND C PANEL
E2
G AND N MOUNTING FIXTURE CRADLE
GRD STRAP
AGC COLD PLATE
P2 56P12
P2 56P11
P2 56P9
G AND N HARNESS
J6 P1
J7 P2
J12 P3
P4 P1
W98
W66
AUX WALL POWER
P2 W88 P1 A30J5
P2 W26 P1 A30J1
WALL POWER
P1 J20
P1 A30J2
J16 P1
J10 P1
J11 P1
J19 P1
J23 P1
E80
W10
W31
P3 P3
W11
W18
P2 J12
P2 J13
P2 J2
PSA TEST POINT ADAPTER
J15 P2
PSA TRAY 7
W69
G AND N MOUNTING FIXTURE BASE
E1
J1 J2 J3 J4 E1
P1 P1 P1 P1
W1 W2 W3 W4
P2 P2 P2 P2
J1 J2 J3 J4
FACILITY GRD W35
W37
W64
E300
ROTARY TABLE
W27
W19
W33
W86
OSCILLOGRAPH CONSOLE
E4
W22
W65
P2 J5
E1
J4 P2 W200
J9 P2 W201
J13 P2 W202
J14 P2 W203
J1 WALL POWER
J8 P2 W209
J2 P3
J7 P4
J11 P5
AGC TEST SET
P1 J1
P1 J2
P1 J3
P1 J9
BUFFER ASSY.
J7 P4
J8 P5
P2 J2
P1 J1
AGC/PSA/SC ADAPTER ASSEMBLY
P3
AGC G&N HARNESS 05A5P3
W34
P2 J1
P2 J3
P1 J4
COOLANT AND POWER SUPPLY CONSOLE
E1
J2 P1
W28
CURRENT SOURCE MONITOR PANEL
J4 P1
P2
WALL POWER
W207
J2 P6
J1
P2
W211
MAIN PANEL DSKY J1
P1
P1 P2 P3 P7 P8
AGC CALIB CONSOLE
E1
P1 ANTENNA
J1 WALL POWER
14651A

Figure 1. G & N Universal Test Station Cabling Diagram

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SUBSYSTEM G & N SYSTEM | ASSY

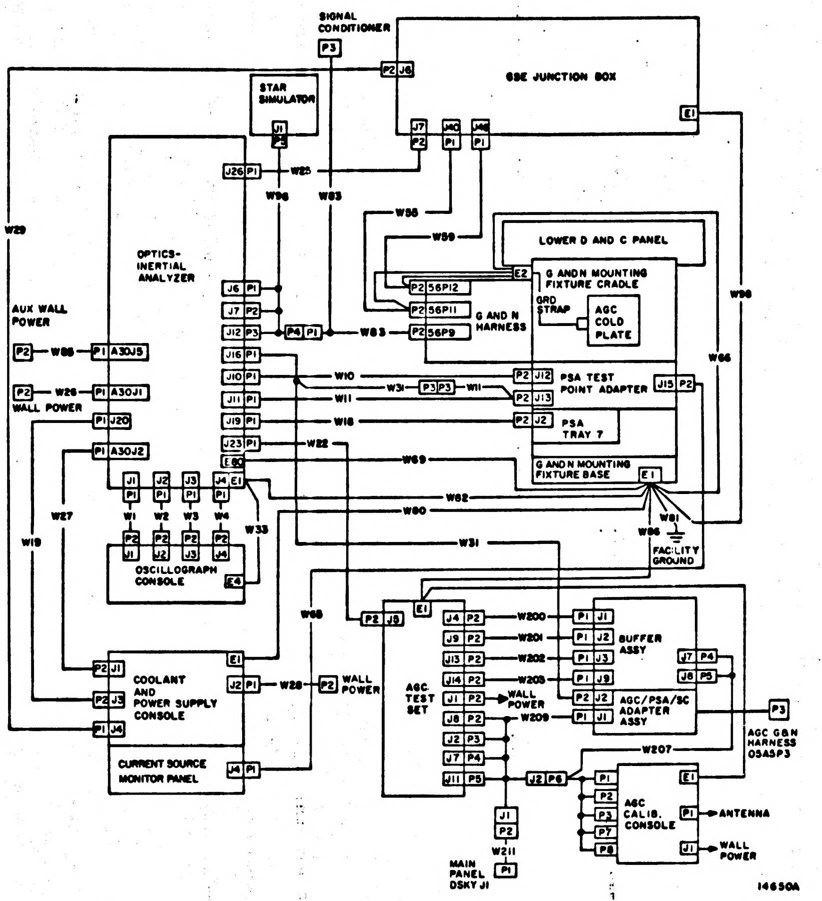
SIGNAL CONDITIONER
P3
P2 J6
GSE JUNCTION BOX
E1
STAR SIMULATOR
J1
P5
J7 P2
J40 P1
J46 P1
J26 P1
W25
W96
W83
W29
W55
W59
LOWER D AND C PANEL
E2
G AND N MOUNTING FIXTURE CRADLE
GRD STRAP
AGC COLD PLATE
OPTICS-INERTIAL ANALYZER
J6 P1
J7 P2
J12 P3
P4 P1
W83
P2 56P12
P2 56P11
P2 56P9
G AND N HARNESS
W98
W66
AUX WALL POWER
P2 W88 P1 A30J5
P2 W26 P1 A30J1
WALL POWER
P1 J20
P1 A30J2
J16 P1
J10 P1
J11 P1
J19 P1
J23 P1
E80
W10
W31
P3 P3
W11
W18
W22
P2 J12
P2 J13
P2 J2
PSA TEST POINT ADAPTER
J15 P2
PSA TRAY 7
W69
G AND N MOUNTING FIXTURE BASE
E1
J1 J2 J3 J4 E1
P1 P1 P1 P1
W1 W2 W3 W4
P2 P2 P2 P2
J1 J2 J3 J4
W27
W19
W33
W82
W80
W81
W86
FACILITY GROUND
OSCILLOGRAPH CONSOLE
E4
W68
P2 J5
E1
J4 P2 W200
J9 P2 W201
J13 P2 W202
J14 P2 W203
J1 P2 WALL POWER
J8 P2 W209
J2 P3
J7 P4
J11 P5
AGC TEST SET
P1 J1
P1 J2
P1 J3
P1 J9
BUFFER ASSY
J7 P4
J8 P5
P2 J2
P1 J1
AGC/PSA/SC ADAPTER ASSY
P3
AGC G&N HARNESS 05A5P3
P2 J1
P2 J3
P1 J4
COOLANT AND POWER SUPPLY CONSOLE
E1
J2 P1
W28
P2 WALL POWER
CURRENT SOURCE MONITOR PANEL
J4 P1
W207
J2 P6
J1
P2
W211
MAIN PANEL DSKY J1
P1
P1 P2 P3 P7 P8
AGC CALIB. CONSOLE
E1
P1 ANTENNA
J1 WALL POWER
14650A

Figure 2. G & N System Test Station Cabling Diagram

DATE ____________

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 **REV.** A **PAGE** 1 **OF** 5
INITIAL TORR 21539 **D.S. PGS** 4

SUBSYSTEM G & N SYSTEM
ASSY.

DESCRIPTION Connect cables and check for continuity and ground isolation. Provides index of GSE operating procedures.

Rev. Let.	Date	TORR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	9-14-65	22430	-	3	WK	ACM

REFERENCES 3-3.11.1.3 through 3-3.11.1.5 of ATP 1026000

IMPORTANT Performance of JDC 10002 required before proceeding with this JDC.

INTERVAL

TOOLS AND MATERIAL Battery Operated Volt-Ohmmeter or Wheatstone Bridge

1. Insure that all JDC's necessary to perform the desired testing are available. Record on data sheet.

2. Insure that all items of test equipment have been calibrated and adjusted in accordance with the applicable Quality Assurance Implementation Plan. Record on data sheet.

3. Insure that G & N System power connectors 56P11 and 56P12 are disconnected from power sources.

4. Insure that:

W96 is not connected to J6, J7, J12 of OIA;

W209 is not connected to J2, J7, J8, J11 of CTS or W207;

W205 is not connected to J4, J5, J6 of Buffer Assembly.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 **REV** A **PAGE** 2 **OF** 5

SUBSYSTEM G & N SYSTEM
ASSY

5. Using Volt-Ohmmeter, measure resistance between following pins:

	GRD SYSTEM	FROM	GRD SYSTEM	TO
a.	0 VDC IMU	56P11-D	structure grd	56P11-L
b.	0 VDC IMU	56P11-D	0 VDC optics	56P11-G
c.	0 VDC IMU	56P11-D	0 VDC AGC	56P11-J
d.	0 VDC IMU	56P11-D	400 115V 10	56P11-K
e.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-E
f.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-F
g.	0 VDC IMU	56P11-D	0 VDC IMU	56P12-D
h.	0 VDC optics	56P11-G	0 VDC optics	56P12-G
i.	0 VDC AGC	56P12-J	0 VDC AGC	56P11-J
j.	structure grd	56P11-L	structure grd	56P12-L
k.	0 VDC IMU	56P11-E	0 VDC IMU	56P12-E
l.	0 VDC IMU	56P11-F	0 VDC IMU	56P12-F
m.	0 VDC Optics	56P11-G	structure grd	56P11-L
n.	0 VDC AGC	56P11-J	0 VDC Optics	56P11-G
o.	0 VDC AGC	56P11-J	structure grd	56P11-L
p.	400-115V Low	56P11-K	structure grd	56P11-L
q.	400-115V Low	56P11-K	0 VDC Optics	56P11-G
r.	400-115V Low	56P11-K	0 VDC AGC	56P11-J

6. With the ATTITUDE IMPULSE CONTROLLER in the positions shown in table 1, make the corresponding resistance measurements. Record indications.

Table 1

	CONTROLLER Position	"A" Resistance	"B" Resistance
a.	ROLL RIGHT	W31-P1 pins X and Z	W31-P1 pins Y and Z
b.	ROLL LEFT	W31-P1 pins X and Z	W31-P1 pins Y and Z
c.	PITCH UP	W31-P1 pins BB and DD	W31-P1 pins CC and DD
d.	PITCH DOWN	W31-P1 pins BB and DD	W31-P1 pins CC and DD
e.	YAW RIGHT	W31-P1 pins EE and GG	W31-P1 pins FF and GG
f.	YAW LEFT	W31-P1 pins EE and GG	W31-P1 pins FF and GG

DATE ______

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 **REV** A **PAGE** 3 **OF** 5

SUBSYSTEM G & N SYSTEM
ASSY

7. Using Volt-Ohmmeter, measure resistance between W31-P1 pins N and P while pressing CHECK CONDITION pushbutton.

8. Using the Volt-Ohmmeter, measure the resistance between point E2 and Facility Ground as shown on Figure 1 or Figure 2 of JDC 10002.

9. Using the Volt-Ohmmeter, measure the resistance between the following pins:

	FROM	TO
a.	56P11-A	56P11-J
b.	56P11-B	56P11-D
c.	56P11-C	56P11-D
d.	56P11-H	56P11-G
e.	56P11-M	56P11-D
f.	56P11-N	56P11-K
g.	56P12-A	56P12-J
h.	56P12-B	56P12-D
i.	56P12-C	56P12-D
j.	56P12-H	56P12-G
k.	56P12-M	56P12-D

10. Insure that the following cables are connected from the GSE to airborne equipment:

Table 2

NOTE: The cable interconnection specified to CTS are necessary only when performing JDC's 10034, 10036 or 10039. If these JDC's are not to be performed, it is not necessary to make the appropriate cable interconnection to the CTS.

GSE - G & N Interconnections

From	Conn. No.		Cable and drawing No.	Conn. No.		To
GSE J Box	J40	P1	W55 (1900999)	P2	P11	56P11
G & N Fixture Cradle	E2					
	E2		W59 (1900997)	P2	P12	56P12
GSE J Box	J46	P1				
OIA	J6	P1	W31 (1901302)	P2	J2	AGC/ PSA/ SC Adapter
Buffer assy. (1020307)	J4 J5 J6	P1 P2 P3	W205 (1020270)	P4	J2	05A7J2
W96	P4	P1	W83 (1901879)	P2	P9	56P9
OIA	J6 J7 J12	P1 P2 P3	W96 (1902347)	P4	P1	W83
CTS	J8 J2 J7 J11	P2 P3 P4 P5	W209 (1020284)	P1	J1	AGC/ PSA/SC Adapter

NOTE: Cable 207 will be connected to J7, J8 of Buffer Assembly at a later time in accordance with specified procedures.

DATE ______

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 **REV** A **PAGE** 4 **OF** 5

SUBSYSTEM G & N SYSTEM
ASSY

11. Insure that ALGA and STRT 1, STRT 2 switches on AGC Buffer Assembly are in the ON position and that the CONDITION LAMPS switch on the G & N Indicator Control Panel is in the ON position.

12. The following JDC's are to be used if operating procedures for GSE Commercial test equipment are required during use of all JDC's necessary to perform the desired testing.

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS

JDC NO.	JOB
18000	Applying Inertial Signals via the Primary Signal Selector Panel
18001	Applying Reference Signals to the Dual Beam Oscilloscope via the Primary Signal Selector Panel
18002	Applying PSA Test Point Adapter Test Point Signals to the Digital Voltmeter, Phase Angle Voltmeter, and Dual Beam Oscilloscope
18003	Applying Auxiliary Signals via the Primary Signal Selector Panel
18004	Applying Auxiliary Coaxial Signals via the Coaxial Distribution Panel
18005	Voltage Measurement - Dual Beam Oscilloscope
18006	Phase Shift Measurements - Dual Beam Oscilloscope
18007	Time Measurements - Dual Beam Oscilloscope
18008	Frequency Measurements - Dual Beam Oscilloscope
18009	Lower Beam (B Scope, Channel 1) Pulse Monitoring - Dual Beam Oscilloscope
18010	Lower Beam (B Scope) Channel 1 and 2 Monitoring - Dual Beam Oscilloscope
18011	Applying Oscillograph Signals to the Dual Beam Oscilloscope
18012	DC Balance Calibration of Signal Generator
18013	Operation of the Signal Generator
18016	Voltage Measurement with the Current Source Monitor and Galvanometer Voltmeter or JDC 00160, Pulse Torque Electronics Tests.
18017	Count Function - Counter
18018	E/UT XN$_1$ Function - Counter
18019	Ratio Function - Counter
18020	Period Function - Counter
18021	Test N$_1$ Function - Counter
18022	Test N$_2$ Function - Counter
18023	Operation of Oscillograph Console (Electric)
18024	Operation of Oscillograph Console (Ink)

DATE ______

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING | **JDC** 10004 **REV** A **PAGE** 5 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

JDC NO.	JOB
18025	Calibration of DC Amplifier - Oscillograph
18026	Operation of DC Amplifiers - Oscillograph
18027	Normal Calibration (800 CPS Reference) of the Phase Sensitive Demodulator - Oscillograph
18028	Normal Calibration (3200 CPS Reference) of the Phase Sensitive Demodulator-Oscillograph
18029	Periodic Phase Shift Check and Calibration (800 CPS Reference) of the Phase Sensitive Demodulator-Oscillograph
18031	Operation of the Phase Sensitive Demodulator - Oscillograph
18032	Ink Cartridge Installation - Oscillograph
18033	Pen Installation - Oscillograph
18034	Change Paper - Oscillograph
18035	DC Voltage Measurement - Digital Voltmeter
18036	AC Voltage Measurement - Digital Voltmeter
18037	Automatic Measurement of an AC or DC Voltage - Digital Voltmeter
18038	Measurement of a Total RMS Voltage - Phase Angle Voltmeter
18039	Measurement of a Fundamental RMS Component - Phase Angle Voltmeter
18040	Measurement of a Phase Angle - Phase Angle Voltmeter
18041	Measurement of In-Phase and Quadrature Components - Phase Angle Voltmeter
18042	Indication of a Phase Sensitive Null - Phase Angle Voltmeter
18043	Operation of the Digital Recorder
18044	Gimbal Position Control Panel Operation and Calibration (Inertial Subsystem Test Only)
18045	Operation of Purging and Filling Fixture
18046	G & N Coolant and Power Console Operation and Interconnections

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 1 **OF** 4

JDC
NO. 10004
REV. A
INITIAL TDRR 21539

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

ASSEMBLY UNDER TEST

TITLE ________
SER. NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ (START) ________ (END) ________ (SITE / LOCATION)
TIME ________ (START) ________ (END) ________ (TOTAL ELAPSED)

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ CAL DATE
NAME ________ SER. NO. ________ CAL DATE

CONDUCTED BY ________ (NAME/AFFILIATION) APPROVED BY ________ (NAME/AFFILIATION)

JDC ITEM NUMBER 1 NECESSARY JDC's (list JDC'S with Revision letter necessary to complete testing as per applicable FTM 1026000 or ND 1021041 for field-site testing.)	Tester's Initials

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 4

JDC
NO. 10004
REV. A

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NUMBER 2 CALIBRATION OF TEST EQUIPMENT:	REJECTED	ACCEPTED
Indicate acceptance or rejection of test equipment calibration as per applicable Quality Assurance Implementation Plan.		

REMARKS:

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 **OF** 4

JDC
NO. 10004
REV. A

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
5.a	Resistance	mego	5.0				infinity		
5.b	Resistance	ohms	1000.0				infinity		
5.c	Resistance	ohms	1000.0				infinity		
5.d	Resistance	mego	5.0				infinity		
5.e	Resistance	ohm	0				0.5		
5.f	Resistance	ohm	0				0.5		
5.g	Resistance	ohm	0				0.5		
5.h	Resistance	ohm	0				0.5		
5.i	Resistance	ohm	0				0.5		
5.j	Resistance	ohm	0				0.5		
5.k	Resistance	ohm	0				0.5		
5.l	Resistance	ohm	0				0.5		
5.m	Resistance	mego	5.0						
5.n	Resistance	ohms	1000.0						
5.o	Resistance	ohms	0				2.0		
5.p	Resistance	mego	5.0						
5.q	Resistance	mego	5.0						
5.r	Resistance	mego	5.0						
6.a	Roll Right A	ohms	0				100		
	Roll Right B	mego	0.1						
6.b	Roll Left A	mego	0.1						
	Roll Left B	ohms	0				100		

* TO BE USED AS REQUIRED OR DESIRED

REMARKS:

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 4

JDC
NO. 0004
REV. A

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
6.c	Pitch Up A	ohms	0				100		
	Pitch Up B	mego	0.1						
6.d	Pitch Down A	mego	0.1						
	Pitch Down B	ohms	0				100		
6.e	Yaw Right A	ohms	0				100		
	Yaw Right B	mego	0.1						
6.f	Yaw Left A	mego	0.1						
	Yaw Left B	ohms	0				100		
7	S/C lamp test	ohms	0				2		
8	Resistance	ohms	0				0.5		
9.a	Resistance	ohms	2.4				▨		
9.b	Resistance	ohms	2.4				▨		
9.c	Resistance	ohms	2.4				▨		
9.d	Resistance	ohms	7.7				▨		
9.e	Resistance	ohms	11.8				▨		
9.f	Resistance	ohms	2.0				▨		
9.g	Resistance	ohms	2.4				▨		
9.h	Resistance	ohms	2.4				▨		
9.i	Resistance	ohms	2.4				▨		
9.j	Resistance	ohms	7.7				▨		
9.k	Resistance	ohms	11.8				▨		

* TO BE USED AS REQUIRED OR DESIRED

REMARKS:

DATE ______

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV. B PAGE 1 OF 5

INITIAL TDRR 21539 D.S. PGS 4

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION Connect cables and check for continuity and ground isolation. Provides index of GSE operating procedures.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-14-65	22430	-	3	WK	ACM
B	11-3-65	23733	All	All	WK	ACM

REFERENCES 3-3.11.1.3 through 3-3.11.1.5 of ATP 1026000

IMPORTANT Performance of JDC 10002 required before proceeding with this JDC.

INTERVAL

TOOLS AND MATERIAL Battery Operated Volt-Ohmmeter or Wheatstone Bridge

1. Insure that all JDC's necessary to perform the desired testing are available. Record on data sheet.

2. Insure that all items of test equipment have been calibrated and adjusted in accordance with the applicable Quality Assurance Implementation Plan. Record on data sheet.

3. Insure that G & N System power connectors 56P11 and 56P12 are disconnected from power sources.

4. Insure that:

W96 is not connected to J6, J7, J12 of OIA;

W209 is not connected to J2, J7, J8, J11 of CTS or W207;

W205 is not connected to J4, J5, J6 of Buffer Assembly.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV B PAGE 2 OF 5

SUBSYSTEM G & N SYSTEM

ASSY

5. Using Volt-Ohmmeter, measure resistance between following pins:

	GRD SYSTEM	FROM	GRD SYSTEM	TO
a.	0 VDC IMU	56P11-D	structure grd	56P11-L
b.	0 VDC IMU	56P11-D	0 VDC optics	56P11-G
c.	0 VDC IMU	56P11-D	0 VDC AGC	56P11-J
d.	0 VDC IMU	56P11-D	400 115V 10	56P11-K
e.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-E
f.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-F
g.	0 VDC IMU	56P11-D	0 VDC IMU	56P12-D
h.	0 VDC optics	56P11-G	0 VDC optics	56P12-G
i.	0 VDC AGC	56P12-J	0 VDC AGC	56P11-J
j.	structure grd	56P11-L	structure grd	56P12-L
k.	0 VDC IMU	56P11-E	0 VDC IMU	56P12-E
l.	0 VDC IMU	56P11-F	0 VDC IMU	56P12-F
m.	0 VDC Optics	56P11-G	structure grd	56P11-L
n.	0 VDC AGC	56P11-J	0 VDC Optics	56P11-G
o.	0 VDC AGC	56P11-J	structure grd	56P11-L
p.	400-115V Low	56P11-K	structure grd	56P11-L
q.	400-115V Low	56P11-K	0 VDC Optics	56P11-G
r.	400-115V Low	56P11-K	0 VDC AGC	56P11-J

6. With the ATTITUDE IMPULSE CONTROLLER in the positions shown in table 1, make the corresponding resistance measurements. Record indications.

Table 1

	CONTROLLER Position	"A" Resistance	"B" Resistance
a.	ROLL RIGHT	W31-P1 pins x and z	W31-P1 pins y and z
b.	ROLL LEFT	W31-P1 pins x and z	W31-P1 pins y and z
c.	PITCH UP	W31-P1 pins BB and DD	W31-P1 pins CC and DD
d.	PITCH DOWN	W31-P1 pins BB and DD	W31-P1 pins CC and DD
e.	YAW RIGHT	W31-P1 pins EE and GG	W31-P1 pins FF and GG
f.	YAW LEFT	W31-P1 pins EE and GG	W31-P1 pins FF and GG

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV B PAGE 3 OF 5

SUBSYSTEM G & N SYSTEM

ASSY

7. Using Volt-Ohmmeter, measure resistance between W31-P1 pins N and P while pressing CHECK CONDITION pushbutton.

8. Using the Volt-Ohmmeter, measure the resistance between point E2 and Facility Ground as shown on Figure 1 or Figure 2 of JDC 10002.

9. Using the Volt-Ohmmeter, measure the resistance between the following pins:

	FROM	TO
a.	56P11-A	56P11-J
b.	56P11-B	56P11-D
c.	56P11-C	56P11-D
d.	56P11-H	56P11-G
e.	56P11-M	56P11-D
f.	56P11-N	56P11-K
g.	56P12-A	56P12-J
h.	56P12-B	56P12-D
i.	56P12-C	56P12-D
j.	56P12-H	56P12-G
k.	56P12-M	56P12-D

10. Insure that the following cables are connected from the GSE to airborne equipment:

Table 2

NOTE: The cable interconnection specified to CTS are necessary only when performing JDC's 10034, 10036 or 10039. If these JDC's are not to be performed, it is not necessary to make the appropriate cable interconnection to the CTS.

GSE - G & N Interconnections

From	Conn. No.		Cable and drawing No.	Conn. No.		To
GSE J Box	J40	P1	W55 (1900999)	P2	P11	56P11
G & N Fixture Cradle	E2					
	E2		W59 (1900997)	P2	P12	56P12
GSE J Box	J46	P1				
OIA	J6	P1	W31 (1901302)	P2	J2	AGC/ PSA/ SC Adapter
Buffer assy. (1020307)	J4 J5 J6	P1 P2 P3	W205 (1020270)	P4	J2	05A7J2
W96	P4	P1	W83 (1901879)	P2	P9	56P9
OIA	J6 J7 J12	P1 P2 P3	W96 (1902347)	P4	P1	W83
CTS	J8 J2 J7 J11	P2 P3 P4 P5	W209 (1020284)	P1	J1	AGC/ PSA/SC Adapter

NOTE: Cable 207 will be connected to J7, J8 of Buffer Assembly at a later time in accordance with specified procedures.

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV B PAGE 4 OF 5

SUBSYSTEM G & N SYSTEM

ASSY

11. Insure that ALGA and STRT 1, STRT 2 switches on AGC Buffer Assembly are in the ON position and that the CONDITION LAMPS switch on the G & N Indicator Control Panel is in the ON position.

12. The following JDC's are to be used if operating procedures for GSE Commercial test equipment are required during use of all JDC's necessary to perform the desired testing.

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS

JDC NO.	JOB
18000	Applying Inertial Signals via the Primary Signal Selector Panel
18001	Applying Reference Signals to the Dual Beam Oscilloscope via the Primary Signal Selector Panel
18002	Applying PSA Test Point Adapter Test Point Signals to the Digital Voltmeter, Phase Angle Voltmeter, and Dual Beam Oscilloscope
18003	Applying Auxiliary Signals via the Primary Signal Selector Panel
18004	Applying Auxiliary Coaxial Signals via the Coaxial Distribution Panel
18005	Voltage Measurement - Dual Beam Oscilloscope
18006	Phase Shift Measurements - Dual Beam Oscilloscope
18007	Time Measurements - Dual Beam Oscilloscope
18008	Frequency Measurements - Dual Beam Oscilloscope
18009	Lower Beam (B Scope, Channel 1) Pulse Monitoring - Dual Beam Oscilloscope
18010	Lower Beam (B Scope) Channel 1 and 2 Monitoring - Dual Beam Oscilloscope
18011	Applying Oscillograph Signals to the Dual Beam Oscilloscope
18012	DC Balance Calibration of Signal Generator
18013	Operation of the Signal Generator
18016	Voltage Measurement with the Current Source Monitor and Galvanometer Voltmeter or JDC 00160, Pulse Torque Electronics Tests.
18017	Count Function - Counter
18018	E/UT XN$_1$ Function - Counter
18019	Ratio Function - Counter
18020	Period Function - Counter
18021	Test N$_1$ Function - Counter
18022	Test N$_2$ Function - Counter
18023	Operation of Oscillograph Console (Electric)
18024	Operation of Oscillograph Console (Ink)

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING | **JDC** 10004 **REV** B **PAGE** 5 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

JDC NO.	JOB
18025	Calibration of DC Amplifier - Oscillograph
18026	Operation of DC Amplifiers - Oscillograph
18027	Normal Calibration (800 CPS Reference) of the Phase Sensitive Demodulator - Oscillograph
18028	Normal Calibration (3200 CPS Reference) of the Phase Sensitive Demodulator-Oscillograph
18029	Periodic Phase Shift Check and Calibration (800 CPS Reference) of the Phase Sensitive Demodulator-Oscillograph
18031	Operation of the Phase Sensitive Demodulator - Oscillograph
18032	Ink Cartridge Installation - Oscillograph
18033	Pen Installation - Oscillograph
18034	Change Paper - Oscillograph
18035	DC Voltage Measurement - Digital Voltmeter
18036	AC Voltage Measurement - Digital Voltmeter
18037	Automatic Measurement of an AC or DC Voltage - Digital Voltmeter
18038	Measurement of a Total RMS Voltage - Phase Angle Voltmeter
18039	Measurement of a Fundamental RMS Component - Phase Angle Voltmeter
18040	Measurement of a Phase Angle - Phase Angle Voltmeter
18041	Measurement of In-Phase and Quadrature Components - Phase Angle Voltmeter
18042	Indication of a Phase Sensitive Null - Phase Angle Voltmeter
18043	Operation of the Digital Recorder
18044	Gimbal Position Control Panel Operation and Calibration (Inertial Subsystem Test Only)
18045	Operation of Purging and Filling Fixture
18046	G & N Coolant and Power Console Operation and Interconnections

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 4

JDC
NO. 10004
REV. B
INITIAL TDRR 21539

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NUMBER 1 NECESSARY JDC's (list JDC'S with Revision letter necessary to complete testing as per applicable FTM 1026000 or ND 1021041 for field-site testing.)	Tester's Initials

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 4

JDC
NO. 10004
REV. B

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NUMBER 2 CALIBRATION OF TEST EQUIPMENT:	REJECTED	ACCEPTED
Indicate acceptance or rejection of test equipment calibration as per applicable Quality Assurance Implementation Plan.		

REMARKS:

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 **OF** 4

JDC
NO. 10004
REV. B

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
5.a	Resistance	mego	5.0				infinity		
5.b	Resistance	ohms	1000.0				infinity		
5.c	Resistance	ohms	1000.0				infinity		
5.d	Resistance	mego	5.0				infinity		
5.e	Resistance	ohm	0				0.5		
5.f	Resistance	ohm	0				0.5		
5.g	Resistance	ohm	0				0.5		
5.h	Resistance	ohm	0				0.5		
5.i	Resistance	ohm	0				0.5		
5.j	Resistance	ohm	0				0.5		
5.k	Resistance	ohm	0				0.5		
5.l	Resistance	ohm	0				0.5		
5.m	Resistance	mego	5.0						
5.n	Resistance	ohms	1000.0						
5.o	Resistance	ohms	0				2.0		
5.p	Resistance	mego	5.0						
5.q	Resistance	mego	5.0						
5.r	Resistance	mego	5.0						
6.a	Roll Right A Roll Right B	ohms mego	0 0.1				100		
6.b	Roll Left A Roll Left B	mego ohms	0.1 0				100		

*** TO BE USED AS REQUIRED OR DESIRED**

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 4

JDC
NO. 10004
REV. B

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
6.c	Pitch Up A	ohms	0				100		
	Pitch Up B	mego	0.1						
6.d	Pitch Down A	mego	0.1						
	Pitch Down B	ohms	0				100		
6.e	Yaw Right A	ohms	0				100		
	Yaw Right B	mego	0.1						
6.f	Yaw Left A	mego	0.1						
	Yaw Left B	ohms	0				100		
7	S/C lamp test	ohms	0				2		
8	Resistance	ohms	0				0.5		
9.a	Resistance	ohms	2.4				▨		
9.b	Resistance	ohms	2.4				▨		
9.c	Resistance	ohms	2.4				▨		
9.d	Resistance	ohms	7.7				▨		
9.e	Resistance	ohms	11.8				▨		
9.f	Resistance	ohms	2.0				▨		
9.g	Resistance	ohms	2.4				▨		
9.h	Resistance	ohms	2.4				▨		
9.i	Resistance	ohms	2.4				▨		
9.j	Resistance	ohms	7.7				▨		
9.k	Resistance	ohms	11.8				▨		

*** TO BE USED AS REQUIRED OR DESIRED**

REMARKS:

DATE 12 AUG 65

PREPARE GSE FOR G & N SYSTEM
JOB ACCEPTANCE TESTING

JDC 10004 **REV.** C **PAGE** 1 **OF** 5
INITIAL TDRR 21539 **D.S. PGS** 4

SUBSYSTEM G & N SYSTEM
ASSY.

DESCRIPTION Connect cables and check for continuity and ground isolation. Provides index of GSE operating procedures.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-14-65	22430	-	3	WK	ACM
(M B	11-3-65	23733	All	All	WK	ACM
C	12-21-65	24815	3	-	WK	-

REFERENCES 3-3.11.1.3 through 3-3.11.1.5 of ATP 1026000

IMPORTANT Performance of JDC 10002 required before proceeding with this JDC.

INTERVAL

TOOLS AND MATERIAL Battery Operated Volt-Ohmmeter or Wheatstone Bridge

1. Insure that all JDC's necessary to perform the desired testing are available. Record on data sheet.

2. Insure that all items of test equipment have been calibrated and adjusted in accordance with the applicable Quality Assurance Implementation Plan. Record on data sheet.

3. Insure that G & N System power connectors 56P11 and 56P12 are disconnected from power sources.

4. Insure that:

W96 is not connected to J6, J7, J12 of OIA;

W209 is not connected to J2, J7, J8, J11 of CTS or W207;

W205 is not connected to J4, J5, J6 of Buffer Assembly.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 AUG 65

PREPARE GSE FOR G & N SYSTEM
JOB ACCEPTANCE TESTING

JDC 10004 **REV** C **PAGE** 2 **OF** 5

SUBSYSTEM G & N SYSTEM
ASSY

5. Using Volt-Ohmmeter, measure resistance between following pins:

	GRD SYSTEM	FROM	GRD SYSTEM	TO
a.	0 VDC IMU	56P11-D	structure grd	56P11-L
b.	0 VDC IMU	56P11-D	0 VDC optics	56P11-G
c.	0 VDC IMU	56P11-D	0 VDC AGC	56P11-J
d.	0 VDC IMU	56P11-D	400 115V 10	56P11-K
e.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-E
f.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-F
g.	0 VDC IMU	56P11-D	0 VDC IMU	56P12-D
h.	0 VDC optics	56P11-G	0 VDC optics	56P12-G
i.	0 VDC AGC	56P12-J	0 VDC AGC	56P11-J
j.	structure grd	56P11-L	structure grd	56P12-L
k.	0 VDC IMU	56P11-E	0 VDC IMU	56P12-E
l.	0 VDC IMU	56P11-F	0 VDC IMU	56P12-F
m.	0 VDC Optics	56P11-G	structure grd	56P11-L
n.	0 VDC AGC	56P11-J	0 VDC Optics	56P11-G
o.	0 VDC AGC	56P11-J	structure grd	56P11-L
p.	400-115V Low	56P11-K	structure grd	56P11-L
q.	400-115V Low	56P11-K	0 VDC Optics	56P11-G
r.	400-115V Low	56P11-K	0 VDC AGC	56P11-J

6. With the ATTITUDE IMPULSE CONTROLLER in the positions shown in table 1, make the corresponding resistance measurements. Record indications.

Table 1

	CONTROLLER Position	"A" Resistance	"B" Resistance
a.	ROLL RIGHT	W31-P1 pins x and z	W31-P1 pins y and z
b.	ROLL LEFT	W31-P1 pins x and z	W31-P1 pins y and z
c.	PITCH UP	W31-P1 pins BB and DD	W31-P1 pins CC and DD
d.	PITCH DOWN	W31-P1 pins BB and DD	W31-P1 pins CC and DD
e.	YAW RIGHT	W31-P1 pins EE and GG	W31-P1 pins FF and GG
f.	YAW LEFT	W31-P1 pins EE and GG	W31-P1 pins FF and GG

DATE 12 AUG 65

PREPARE GSE FOR G & N SYSTEM
JOB ACCEPTANCE TESTING

JDC 10004 **REV** C **PAGE** 3 **OF** 5

SUBSYSTEM G & N SYSTEM
ASSY

7. Using Volt-Ohmmeter, measure resistance between W31-P1 pins N and P while pressing CHECK CONDITION pushbutton.

8. Using the Volt-Ohmmeter, measure the resistance between point E2 and Facility Ground as shown on Figure 1 or Figure 2 of JDC 10002.

9. Using the Volt-Ohmmeter, measure the resistance between the following pins:

	FROM	TO
a.	56P11-A	56P11-J
b.	56P11-B	56P11-D
c.	56P11-C	56P11-D
d.	56P11-H	56P11-G
e.	56P11-M	56P11-D
f.	56P11-N	56P11-K
g.	56P12-A	56P12-J
h.	56P12-B	56P12-D
i.	56P12-C	56P12-D
j.	56P12-H	56P12-G
k.	56P12-M	56P12-D

10. Insure that the following cables are connected from the GSE to airborne equipment:

Table 2

NOTE: The cable interconnection specified to CTS are necessary only when performing JDC's 10034, 10036 or 10039. If these JDC's are not to be performed, it is not necessary to make the appropriate cable interconnection to the CTS.

GSE - G & N Interconnections

From	Conn. No.		Cable and drawing No.	Conn. No.		To
GSE J Box	J40	P1	W55 (1900999)	P2	P11	56P11
G & N Fixture Cradle	E2 E2		W59 (1900997)	P2	P12	56P12
GSE J Box	J46	P1				
OIA	16	P1	W31 (1901302)	P2	J2	AGC/ PSA/ SC Adapter
Buffer assy. (1020307)	J4 J5 J6	P1 P2 P3	W205 (1020270)	P4	J2	05A7J2
W96	P4	P1	W83 (1901879)	P2	P9	56P9
OIA	J6 J7 J12	P1 P2 P3	W96 (1902347)	P4	P1	W83
CTS	J8 J2 J7 J11	P2 P3 P4 P5	W209 (1020284)	P1	J1	AGC/ PSA/SC Adapter

NOTE: Cable 207 will be connected to J7, J8 of Buffer Assembly at a later time in accordance with specified procedures.

DATE 12 AUG 65

PREPARE GSE FOR G & N SYSTEM
JOB ACCEPTANCE TESTING

JDC 10004 **REV** C **PAGE** 4 **OF** 5

SUBSYSTEM G & N SYSTEM
ASSY

11. Insure that ALGA and STRT 1, STRT 2 switches on AGC Buffer Assembly are in the ON position and that the CONDITION LAMPS switch on the G & N Indicator Control Panel is in the ON position.

12. The following JDC's are to be used if operating procedures for GSE Commercial test equipment are required during use of all JDC's necessary to perform the desired testing.

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS

JDC NO.	JOB
18000	Applying Inertial Signals via the Primary Signal Selector Panel
18001	Applying Reference Signals to the Dual Beam Oscilloscope via the Primary Signal Selector Panel
18002	Applying PSA Test Point Adapter Test Point Signals to the Digital Voltmeter, Phase Angle Voltmeter, and Dual Beam Oscilloscope
18003	Applying Auxiliary Signals via the Primary Signal Selector Panel
18004	Applying Auxiliary Coaxial Signals via the Coaxial Distribution Panel
18005	Voltage Measurement - Dual Beam Oscilloscope
18006	Phase Shift Measurements - Dual Beam Oscilloscope
18007	Time Measurements - Dual Beam Oscilloscope
18008	Frequency Measurements - Dual Beam Oscilloscope
18009	Lower Beam (B Scope, Channel 1) Pulse Monitoring - Dual Beam Oscilloscope
18010	Lower Beam (B Scope) Channel 1 and 2 Monitoring - Dual Beam Oscilloscope
18011	Applying Oscillograph Signals to the Dual Beam Oscilloscope
18012	DC Balance Calibration of Signal Generator
18013	Operation of the Signal Generator
18016	Voltage Measurement with the Current Source Monitor and Galvanometer Voltmeter or JDC 00160, Pulse Torque Electronics Tests.
18017	Count Function - Counter
18018	E/UT XN$_1$ Function - Counter
18019	Ratio Function - Counter
18020	Period Function - Counter
18021	Test N$_1$ Function - Counter
18022	Test N$_2$ Function - Counter
18023	Operation of Oscillograph Console (Electric)
18024	Operation of Oscillograph Console (Ink)

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING | **JDC** 10004 **REV** C **PAGE** 5 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

JDC NO.	JOB
18025	Calibration of DC Amplifier - Oscillograph
18026	Operation of DC Amplifiers - Oscillograph
18027	Normal Calibration (800 CPS Reference) of the Phase Sensitive Demodulator - Oscillograph
18028	Normal Calibration (3200 CPS Reference) of the Phase Sensitive Demodulator-Oscillograph
18029	Periodic Phase Shift Check and Calibration (800 CPS Reference) of the Phase Sensitive Demodulator-Oscillograph
18031	Operation of the Phase Sensitive Demodulator - Oscillograph
18032	Ink Cartridge Installation - Oscillograph
18033	Pen Installation - Oscillograph
18034	Change Paper - Oscillograph
18035	DC Voltage Measurement - Digital Voltmeter
18036	AC Voltage Measurement - Digital Voltmeter
18037	Automatic Measurement of an AC or DC Voltage - Digital Voltmeter
18038	Measurement of a Total RMS Voltage - Phase Angle Voltmeter
18039	Measurement of a Fundamental RMS Component - Phase Angle Voltmeter
18040	Measurement of a Phase Angle - Phase Angle Voltmeter
18041	Measurement of In-Phase and Quadrature Components - Phase Angle Voltmeter
18042	Indication of a Phase Sensitive Null - Phase Angle Voltmeter
18043	Operation of the Digital Recorder
18044	Gimbal Position Control Panel Operation and Calibration (Inertial Subsystem Test Only)
18045	Operation of Purging and Filling Fixture
18046	G & N Coolant and Power Console Operation and Interconnections

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 4

JDC
NO. 10004
REV. C
INITIAL TDRR 21539

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NUMBER 1 NECESSARY JDC's (list JDC'S with Revision letter necessary to complete testing as per applicable FTM 1026000 or ND 1021041 for field-site testing.)	Tester's Initials

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 4

JDC
NO. 10004
REV. C

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NUMBER 2 CALIBRATION OF TEST EQUIPMENT:	REJECTED	ACCEPTED
Indicate acceptance or rejection of test equipment calibration as per applicable Quality Assurance Implementation Plan.		

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 **OF** 4

JDC
NO. 10004
REV. C

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
5.a	Resistance	mego	5.0				infinity		
5.b	Resistance	ohms	1000.0				infinity		
5.c	Resistance	ohms	1000.0				infinity		
5.d	Resistance	mego	5.0				infinity		
5.e	Resistance	ohm	0				0.5		
5.f	Resistance	ohm	0				0.5		
5.g	Resistance	ohm	0				0.5		
5.h	Resistance	ohm	0				0.5		
5.i	Resistance	ohm	0				0.5		
5.j	Resistance	ohm	0				0.5		
5.k	Resistance	ohm	0				0.5		
5.l	Resistance	ohm	0				0.5		
5.m	Resistance	mego	5.0						
5.n	Resistance	ohms	1000.0						
5.o	Resistance	ohms	0				2.0		
5.p	Resistance	mego	5.0						
5.q	Resistance	mego	5.0						
5.r	Resistance	mego	5.0						
6.a	Roll Right A	ohms	0				100		
	Roll Right B	mego	0.1						
6.b	Roll Left A	mego	0.1						
	Roll Left B	ohms	0				100		

*** TO BE USED AS REQUIRED OR DESIRED**

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 **OF** 4

JDC
NO. 10004
REV. C

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
6.c	Pitch Up A	ohms	0				100		
	Pitch Up B	mego	0.1						
6.d	Pitch Down A	mego	0.1						
	Pitch Down B	ohms	0				100		
6.e	Yaw Right A	ohms	0				100		
	Yaw Right B	mego	0.1						
6.f	Yaw Left A	mego	0.1						
	Yaw Left B	ohms	0				100		
7	S/C lamp test	ohms	0				2		
8	Resistance	ohms	0				0.5		
9.a	Resistance	ohms	2.4				▨		
9.b	Resistance	ohms	2.4				▨		
9.c	Resistance	ohms	2.4				▨		
9.d	Resistance	ohms	7.7				▨		
9.e	Resistance	ohms	11.8				▨		
9.f	Resistance	ohms	2.0				▨		
9.g	Resistance	ohms	2.4				▨		
9.h	Resistance	ohms	2.4				▨		
9.i	Resistance	ohms	2.4				▨		
9.j	Resistance	ohms	7.7				▨		
9.k	Resistance	ohms	11.8				▨		

*** TO BE USED AS REQUIRED OR DESIRED**

REMARKS:

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV. D PAGE 1 OF 5

INITIAL TDRR 21539 DS PGS 4

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION Connect cables and check for continuity and ground isolation. Provides index of GSE operating procedures.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-14-65	22430	-	3	WK	ACM
B	11-3-65	23733	All	All	WK	ACM
C	12-21-65	24815	3	-	WK	-
D	3-8-66	26920	3	-	WK	ACM

M
M

REFERENCES 3-3.11.1.3 through 3-3.11.1.5 of ATP 1026000

IMPORTANT Performance of JDC 10002 required before proceeding with this JDC.

INTERVAL

TOOLS AND MATERIAL Battery Operated Volt-Ohmmeter or Wheatstone Bridge

1. Insure that all JDC's necessary to perform the desired testing are available. Record on data sheet.

2. Insure that all items of test equipment have been calibrated and adjusted in accordance with the applicable Quality Assurance Implementation Plan. Record on data sheet.

3. Insure that G & N System power connectors 56P11 and 56P12 are disconnected from power sources.

4. Insure that:

W96 is not connected to J6, J7, J12 of OIA;

W209 is not connected to J2, J7, J8, J11 of CTS or W207;

W205 is not connected to J4, J5, J6 of Buffer Assembly.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV D PAGE 2 OF 5

SUBSYSTEM G & N SYSTEM

ASSY

5. Using Volt-Ohmmeter, measure resistance between following pins:

	GRD SYSTEM	FROM	GRD SYSTEM	TO
a.	0 VDC IMU	56P11-D	structure grd	56P11-L
b.	0 VDC IMU	56P11-D	0 VDC optics	56P11-G
c.	0 VDC IMU	56P11-D	0 VDC AGC	56P11-J
d.	0 VDC IMU	56P11-D	400 115V 10	56P11-K
e.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-E
f.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-F
g.	0 VDC IMU	56P11-D	0 VDC IMU	56P12-D
h.	0 VDC optics	56P11-G	0 VDC optics	56P12-G
i.	0 VDC AGC	56P12-J	0 VDC AGC	56P11-J
j.	structure grd	56P11-L	structure grd	56P12-L
k.	0 VDC IMU	56P11-E	0 VDC IMU	56P12-E
l.	0 VDC IMU	56P11-F	0 VDC IMU	56P12-F
m.	0 VDC Optics	56P11-G	structure grd	56P11-L
n.	0 VDC AGC	56P11-J	0 VDC Optics	56P11-G
o.	0 VDC AGC	56P11-J	structure grd	56P11-L
p.	400-115V Low	56P11-K	structure grd	56P11-L
q.	400-115V Low	56P11-K	0 VDC Optics	56P11-G
r.	400-115V Low	56P11-K	0 VDC AGC	56P11-J

6. With the ATTITUDE IMPULSE CONTROLLER in the positions shown in table 1, make the corresponding resistance measurements. Record indications.

Table 1

	CONTROLLER Position	"A" Resistance	"B" Resistance
a.	ROLL RIGHT	W31-P1 pins x and z	W31-P1 pins y and z
b.	ROLL LEFT	W31-P1 pins x and z	W31-P1 pins y and z
c.	PITCH UP	W31-P1 pins BB and DD	W31-P1 pins CC and DD
d.	PITCH DOWN	W31-P1 pins BB and DD	W31-P1 pins CC and DD
e.	YAW RIGHT	W31-P1 pins EE and GG	W31-P1 pins FF and GG
f.	YAW LEFT	W31-P1 pins EE and GG	W31-P1 pins FF and GG

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV D PAGE 3 OF 5

SUBSYSTEM G & N SYSTEM

ASSY

7. Using Volt-Ohmmeter, measure resistance between W31-P1 pins N and P while pressing CHECK CONDITION pushbutton.

8. Using the Volt-Ohmmeter, measure the resistance between point E2 and Facility Ground as shown on Figure 1 or Figure 2 of JDC 10002.

9. Using the Volt-Ohmmeter, measure the resistance between the following pins:

	FROM	TO
a.	56P11-A	56P11-J
b.	56P11-B	56P11-D
c.	56P11-C	56P11-D
d.	56P11-H	56P11-G
e.	56P11-M	56P11-D
f.	56P11-N	56P11-K
g.	56P12-A	56P12-J
h.	56P12-B	56P12-D
i.	56P12-C	56P12-D
j.	56P12-H	56P12-G
k.	56P12-M	56P12-D

10. Insure that the following cables are connected from the GSE to airborne equipment:

Table 2

NOTE: The cable interconnection specified to CTS are necessary only when performing JDC's 10034, 10036 or 10039. If these JDC's are not to be performed, it is not necessary to make the appropriate cable interconnection to the CTS.

GSE - G & N Interconnections						
From	Conn. No.		Cable and drawing No.	Conn. No.		To
GSE J Box	J40	P1	W55 (1900999)	P2	P11	56P11
G & N Fixture Cradle	E2					
	E2		W59 (1900997)	P2	P12	56P12
GSE J Box	J46	P1				
OIA	16	P1	W31 (1901302)	P2	J2	AGC/ PSA/ SC Adapter
Buffer assy. (1020307)	J4 J5 J6	P1 P2 P3	W205 (1020270)	P4	A50	AGC
W96	P4	P1	W83 (1901879)	P2	P9	56P9
OIA	J6 J7 J12	P1 P2 P3	W96 (1902347)	P4	P1	W83
CTS	J8 J2 J7 J11	P2 P3 P4 P5	W209 (1020284)	P1	J1	AGC/ PSA/SC Adapter

NOTE: Cable 207 will be connected to J7, J8 of Buffer Assembly at a later time in accordance with specified procedures.

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV D PAGE 4 OF 5

SUBSYSTEM G & N SYSTEM

ASSY

11. Insure that ALGA and STRT 1, STRT 2 switches on AGC Buffer Assembly are in the ON position and that the CONDITION LAMPS switch on the G & N Indicator Control Panel is in the ON position.

12. The following JDC's are to be used if operating procedures for GSE Commercial test equipment are required during use of all JDC's necessary to perform the desired testing.

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS

JDC NO.	JOB
18000	Applying Inertial Signals via the Primary Signal Selector Panel
18001	Applying Reference Signals to the Dual Beam Oscilloscope via the Primary Signal Selector Panel
18002	Applying PSA Test Point Adapter Test Point Signals to the Digital Voltmeter, Phase Angle Voltmeter, and Dual Beam Oscilloscope
18003	Applying Auxiliary Signals via the Primary Signal Selector Panel
18004	Applying Auxiliary Coaxial Signals via the Coaxial Distribution Panel
18005	Voltage Measurement - Dual Beam Oscilloscope
18006	Phase Shift Measurements - Dual Beam Oscilloscope
18007	Time Measurements - Dual Beam Oscilloscope
18008	Frequency Measurements - Dual Beam Oscilloscope
18009	Lower Beam (B Scope, Channel 1) Pulse Monitoring - Dual Beam Oscilloscope
18010	Lower Beam (B Scope) Channel 1 and 2 Monitoring - Dual Beam Oscilloscope
18011	Applying Oscillograph Signals to the Dual Beam Oscilloscope
18012	DC Balance Calibration of Signal Generator
18013	Operation of the Signal Generator
18016	Voltage Measurement with the Current Source Monitor and Galvanometer Voltmeter or JDC 00160, Pulse Torque Electronics Tests.
18017	Count Function - Counter
18018	E/UT XN$_1$ Function - Counter
18019	Ratio Function - Counter
18020	Period Function - Counter
18021	Test N$_1$ Function - Counter
18022	Test N$_2$ Function - Counter
18023	Operation of Oscillograph Console (Electric)
18024	Operation of Oscillograph Console (Ink)

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING | **JDC** 10004 **REV** D **PAGE** 5 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

JDC NO.	JOB
18025	Calibration of DC Amplifier - Oscillograph
18026	Operation of DC Amplifiers - Oscillograph
18027	Normal Calibration (800 CPS Reference) of the Phase Sensitive Demodulator - Oscillograph
18028	Normal Calibration (3200 CPS Reference) of the Phase Sensitive Demodulator-Oscillograph
18029	Periodic Phase Shift Check and Calibration (800 CPS Reference) of the Phase Sensitive Demodulator-Oscillograph
18031	Operation of the Phase Sensitive Demodulator - Oscillograph
18032	Ink Cartridge Installation - Oscillograph
18033	Pen Installation - Oscillograph
18034	Change Paper - Oscillograph
18035	DC Voltage Measurement - Digital Voltmeter
18036	AC Voltage Measurement - Digital Voltmeter
18037	Automatic Measurement of an AC or DC Voltage - Digital Voltmeter
18038	Measurement of a Total RMS Voltage - Phase Angle Voltmeter
18039	Measurement of a Fundamental RMS Component - Phase Angle Voltmeter
18040	Measurement of a Phase Angle - Phase Angle Voltmeter
18041	Measurement of In-Phase and Quadrature Components - Phase Angle Voltmeter
18042	Indication of a Phase Sensitive Null - Phase Angle Voltmeter
18043	Operation of the Digital Recorder
18044	Gimbal Position Control Panel Operation and Calibration (Inertial Subsystem Test Only)
18045	Operation of Purging and Filling Fixture
18046	G & N Coolant and Power Console Operation and Interconnections

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 1 **OF** 4

JDC
NO. 10004
REV. D
INITIAL TDRR 21539

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

ASSEMBLY UNDER TEST

TITLE ____________

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END SITE / LOCATION

TIME ______ START ______ END TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________ SER. NO. ______ CAL DATE

NAME ____________ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NUMBER 1 NECESSARY JDC's (list JDC'S with Revision letter necessary to complete testing as per applicable FTM 1026000 or ND 1021041 for field-site testing.)	Tester's Initials

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 4

JDC
NO. 10004
REV. D

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NUMBER 2 CALIBRATION OF TEST EQUIPMENT:	REJECTED	ACCEPTED
Indicate acceptance or rejection of test equipment calibration as per applicable Quality Assurance Implementation Plan.		

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 **OF** 4

JDC
NO. 10004
REV. D

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
5.a	Resistance	mego	5.0				infinity		
5.b	Resistance	ohms	1000.0				infinity		
5.c	Resistance	ohms	1000.0				infinity		
5.d	Resistance	mego	5.0				infinity		
5.e	Resistance	ohm	0				0.5		
5.f	Resistance	ohm	0				0.5		
5.g	Resistance	ohm	0				0.5		
5.h	Resistance	ohm	0				0.5		
5.i	Resistance	ohm	0				0.5		
5.j	Resistance	ohm	0				0.5		
5.k	Resistance	ohm	0				0.5		
5.l	Resistance	ohm	0				0.5		
5.m	Resistance	mego	5.0						
5.n	Resistance	ohms	1000.0						
5.o	Resistance	ohms	0				2.0		
5.p	Resistance	mego	5.0						
5.q	Resistance	mego	5.0						
5.r	Resistance	mego	5.0						
6.a	Roll Right A	ohms	0				100		
	Roll Right B	mego	0.1						
6.b	Roll Left A	mego	0.1						
	Roll Left B	ohms	0				100		

* TO BE USED AS REQUIRED OR DESIRED

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 1 **OF** 4

JDC
NO. 10004
REV. D

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
6.c	Pitch Up A	ohms	0				100		
	Pitch Up B	mego	0.1						
6.d	Pitch Down A	mego	0.1						
	Pitch Down B	ohms	0				100		
6.e	Yaw Right A	ohms	0				100		
	Yaw Right B	mego	0.1						
6.f	Yaw Left A	mego	0.1						
	Yaw Left B	ohms	0				100		
7	S/C lamp test	ohms	0				2		
8	Resistance	ohms	0				0.5		
9.a	Resistance	ohms	2.4				▨		
9.b	Resistance	ohms	2.4				▨		
9.c	Resistance	ohms	2.4				▨		
9.d	Resistance	ohms	7.7				▨		
9.e	Resistance	ohms	11.8				▨		
9.f	Resistance	ohms	2.0				▨		
9.g	Resistance	ohms	2.4				▨		
9.h	Resistance	ohms	2.4				▨		
9.i	Resistance	ohms	2.4				▨		
9.j	Resistance	ohms	7.7				▨		
9.k	Resistance	ohms	11.8				▨		

*** TO BE USED AS REQUIRED OR DESIRED**

REMARKS:

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 **REV.** E **PAGE** 1 **OF** 5
INITIAL TDRR 21539 **D.S. PGS** 4

SUBSYSTEM G & N SYSTEM
ASSY.

DESCRIPTION Connect cables and check for continuity and ground isolation. Provides index of GSE operating procedures.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	9-14-65	22430	-	3	WK	ACM
B	11-3-65	23733	All	All	WK	ACM
C	12-21-65	24815	3	-	WK	-
D	3-8-66	26920	3	-	WK	ACM
E	5-6-66	28577	3,4,5	-	MM	ACM

REFERENCES 3-3.11.1.3 through 3-3.11.1.5 of ATP 1026000

IMPORTANT Performance of JDC 10002 required before proceeding with this JDC.

INTERVAL

TOOLS AND MATERIAL Battery Operated Volt-Ohmmeter or Wheatstone Bridge.

1. Insure that all JDC's necessary to perform the desired testing are available. Record on data sheet.

2. Insure that all items of test equipment have been calibrated and adjusted in accordance with the applicable Quality Assurance Implementation Plan. Record on data sheet.

3. Insure that G & N System power connectors 56P11 and 56P12 are disconnected from power sources.

4. Insure that:

W96 is not connected to J6, J7, J12 of OIA;

W209 is not connected to J2, J7, J8, J11 of CTS or W207;

W205 is not connected to J4, J5, J6 of Buffer Assembly.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 **REV** E **PAGE** 2 **OF** 5

SUBSYSTEM G & N SYSTEM
ASSY

5. Using Volt-Ohmmeter, measure resistance between following pins:

	GRD SYSTEM	FROM	GRD SYSTEM	TO
a.	0 VDC IMU	56P11-D	structure grd	56P11-L
b.	0 VDC IMU	56P11-D	0 VDC optics	56P11-G
c.	0 VDC IMU	56P11-D	0 VDC AGC	56P11-J
d.	0 VDC IMU	56P11-D	400 115V 10	56P11-K
e.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-E
f.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-F
g.	0 VDC IMU	56P11-D	0 VDC IMU	56P12-D
h.	0 VDC optics	56P11-G	0 VDC optics	56P12-G
i.	0 VDC AGC	56P12-J	0 VDC AGC	56P11-J
j.	structure grd	56P11-L	structure grd	56P12-L
k.	0 VDC IMU	56P11-E	0 VDC IMU	56P12-E
l.	0 VDC IMU	56P11-F	0 VDC IMU	56P12-F
m.	0 VDC Optics	56P11-G	structure grd	56P11-L
n.	0 VDC AGC	56P11-J	0 VDC Optics	56P11-G
o.	0 VDC AGC	56P11-J	structure grd	56P11-L
p.	400-115V Low	56P11-K	structure grd	56P11-L
q.	400-115V Low	56P11-K	0 VDC Optics	56P11-G
r.	400-115V Low	56P11-K	0 VDC AGC	56P11-J

6. With the ATTITUDE IMPULSE CONTROLLER in the positions shown in table 1, make the corresponding resistance measurements. Record indications.

Table 1

	CONTROLLER Position	"A" Resistance	"B" Resistance
a.	ROLL RIGHT	W31-P1 pins x and z	W31-P1 pins y and z
b.	ROLL LEFT	W31-P1 pins x and z	W31-P1 pins y and z
c.	PITCH UP	W31-P1 pins BB and DD	W31-P1 pins CC and DD
d.	PITCH DOWN	W31-P1 pins BB and DD	W31-P1 pins CC and DD
e.	YAW RIGHT	W31-P1 pins EE and GG	W31-P1 pins FF and GG
f.	YAW LEFT	W31-P1 pins EE and GG	W31-P1 pins FF and GG

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 **REV** E **PAGE** 3 **OF** 5

SUBSYSTEM G & N SYSTEM
ASSY

7. Using Volt-Ohmmeter, measure resistance between W31-P1 pins N and P while pressing CHECK CONDITION pushbutton.

8. Using the Volt-Ohmmeter, measure the resistance between point E2 and Facility Ground as shown on Figure 1 or Figure 2 of JDC 10002.

9. Using the Volt-Ohmmeter, measure the resistance between the following pins:

	FROM	TO
a.	56P11-A	56P11-J
b.	56P11-B	56P11-D
c.	56P11-C	56P11-D
d.	56P11-H	56P11-G
e.	56P11-M	56P11-D
f.	56P11-N	56P11-K
g.	56P12-A	56P12-J
h.	56P12-B	56P12-D
i.	56P12-C	56P12-D
j.	56P12-H	56P12-G
k.	56P12-M	56P12-D

10. Insure that the following cables are connected from the GSE to airborne equipment:

Table 2

NOTE: The cable interconnection specified to CTS are necessary only when performing JDC's 10034, 10036 or 10039. If these JDC's are not to be performed, it is not necessary to make the appropriate cable interconnection to the CTS.

GSE - G & N Interconnections

From	Conn. No.		Cable and drawing No.	Conn. No.		To
GSE J Box	J40	P1	W55 (1900999)	P2	P11	56P11
G & N Fixture Cradle	E2	P3				
	E2	P3	W59 (1900997)	P2	P12	56P12
GSE J Box	J46	P1				
OIA	16	P1	W31 (1901302)	P2	J2	AGC/ PSA/ SC Adapter
Buffer assy. (1020307)	J4 J5 J6	P1 P2 P3	W205 (1020270)	P4	A50	AGC
W96	P4	P1	W83 (1901879)	P2	P9	56P9
OIA	J6 J7 J12	P1 P2 P3	W96 (1902347)	P4	P1	W83
CTS	J8 J2 J7 J11	P2 P3 P4 P5	W209 (1020284)	P1	J1	AGC/ PSA/SC Adapter

NOTE: Cable 207 will be connected to J7, J8 of Buffer Assembly at a later time in accordance with specified procedures.

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 **REV** E **PAGE** 4 **OF** 5

SUBSYSTEM G & N SYSTEM
ASSY

11. Insure that ALGA and STRT 1, STRT 2 switches on AGC Buffer Assembly are in the ON position and that the CONDITION LAMPS switch on the G & N Indicator Control Panel is in the ON position.

12. When using 100/Block II/LEM OIA, insure that the BLOCK 1 SERIES 100 and G & N TEST CONFIG lamps on the Monitor panel are lighted.

13. The following JDC's are to be used if operating procedures for GSE Commercial test equipment are required during use of all JDC's necessary to perform the desired testing.

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS

JDC NO.	JOB
18000	Applying Inertial Signals via the Primary Signal Selector Panel
18001	Applying Reference Signals to the Dual Beam Oscilloscope via the Primary Signal Selector Panel
18002	Applying PSA Test Point Adapter Test Point Signals to the Digital Voltmeter, Phase Angle Voltmeter, and Dual Beam Oscilloscope
18003	Applying Auxiliary Signals via the Primary Signal Selector Panel
18004	Applying Auxiliary Coaxial Signals via the Coaxial Distribution Panel
18005	Voltage Measurement - Dual Beam Oscilloscope
18006	Phase Shift Measurements - Dual Beam Oscilloscope
18007	Time Measurements - Dual Beam Oscilloscope
18008	Frequency Measurements - Dual Beam Oscilloscope
18009	Lower Beam (B Scope, Channel 1) Pulse Monitoring - Dual Beam Oscilloscope
18010	Lower Beam (B Scope) Channel 1 and 2 Monitoring - Dual Beam Oscilloscope
18011	Applying Oscillograph Signals to the Dual Beam Oscilloscope
18012	DC Balance Calibration of Signal Generator
18013	Operation of the Signal Generator
18016	Voltage Measurement with the Current Source Monitor and Galvanometer Voltmeter or JDC 00160, Pulse Torque Electronics Tests.
18017	Count Function - Counter
18018	E/UT XN_1 Function - Counter
18019	Ratio Function - Counter
18020	Period Function - Counter
18021	Test N_1 Function - Counter
18022	Test N_2 Function - Counter
18023	Operation of Oscillograph Console (Electric)
18024	Operation of Oscillograph Console (Ink)

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING | **JDC** 10004 **REV** E **PAGE** 5 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

JDC NO.	JOB
18025	Calibration of DC Amplifier - Oscillograph
18026	Operation of DC Amplifiers - Oscillograph
18027	Normal Calibration (800 CPS Reference) of the Phase Sensitive Demodulator - Oscillograph
18028	Normal Calibration (3200 CPS Reference) of the Phase Sensitive Demodulator-Oscillograph
18029	Periodic Phase Shift Check and Calibration (800 CPS Reference) of the Phase Sensitive Demodulator-Oscillograph
18031	Operation of the Phase Sensitive Demodulator - Oscillograph
18032	Ink Cartridge Installation - Oscillograph
18033	Pen Installation - Oscillograph
18034	Change Paper - Oscillograph
18035	DC Voltage Measurement - Digital Voltmeter
18036	AC Voltage Measurement - Digital Voltmeter
18037	Automatic Measurement of an AC or DC Voltage - Digital Voltmeter
18038	Measurement of a Total RMS Voltage - Phase Angle Voltmeter
18039	Measurement of a Fundamental RMS Component - Phase Angle Voltmeter
18040	Measurement of a Phase Angle - Phase Angle Voltmeter
18041	Measurement of In-Phase and Quadrature Components - Phase Angle Voltmeter
18042	Indication of a Phase Sensitive Null - Phase Angle Voltmeter
18043	Operation of the Digital Recorder
18044	Gimbal Position Control Panel Operation and Calibration (Inertial Subsystem Test Only)
18045	Operation of Purging and Filling Fixture
18046	G & N Coolant and Power Console Operation and Interconnections
18049	Maintain and Monitor IMU Heat Using ICTC
18103	Applying Auxiliary Signals via the Primary Signal Selector Panel
18104	Applying Signals to the Dual Beam Oscilloscope via the Auxiliary Input Panel
18249	Maintain and Monitor IMU Using Portable Temperature Controller
18260	Performance Verification of the Digital Voltmeter
18261	Performance Verification of the Phase Angle Voltmeter

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 4

JDC
NO. 10004
REV. E
INITIAL TDRR 21539

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NUMBER 1 NECESSARY JDC's (list JDC'S with Revision letter necessary to complete testing as per applicable FTM 1026000 or ND 1021041 for field-site testing.)	Tester's Initials

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 4

JDC
NO. 10004
REV. E

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NUMBER 2 CALIBRATION OF TEST EQUIPMENT:	REJECTED	ACCEPTED
Indicate acceptance or rejection of test equipment calibration as per applicable Quality Assurance Implementation Plan.		

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 **OF** 4

JDC
NO. 10004
REV. E

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
5.a	Resistance	mego	5.0				infinity		
5.b	Resistance	ohms	1000.0				infinity		
5.c	Resistance	ohms	1000.0				infinity		
5.d	Resistance	mego	5.0				infinity		
5.e	Resistance	ohm	0				0.5		
5.f	Resistance	ohm	0				0.5		
5.g	Resistance	ohm	0				0.5		
5.h	Resistance	ohm	0				0.5		
5.i	Resistance	ohm	0				0.5		
5.j	Resistance	ohm	0				0.5		
5.k	Resistance	ohm	0				0.5		
5.l	Resistance	ohm	0				0.5		
5.m	Resistance	mego	5.0						
5.n	Resistance	ohms	1000.0						
5.o	Resistance	ohms	0				2.0		
5.p	Resistance	mego	5.0						
5.q	Resistance	mego	5.0						
5.r	Resistance	mego	5.0						
6.a	Roll Right A	ohms	0				100		
	Roll Right B	mego	0.1						
6.b	Roll Left A	mego	0.1						
	Roll Left B	ohms	0				100		

*** TO BE USED AS REQUIRED OR DESIRED**

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 **OF** 4

JDC
NO. 10004
REV. E

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
6.c	Pitch Up A	ohms	0				100		
	Pitch Up B	mego	0.1						
6.d	Pitch Down A	mego	0.1						
	Pitch Down B	ohms	0				100		
6.e	Yaw Right A	ohms	0				100		
	Yaw Right B	mego	0.1						
6.f	Yaw Left A	mego	0.1						
	Yaw Left B	ohms	0				100		
7	S/C lamp test	ohms	0				2		
8	Resistance	ohms	0				0.5		
9.a	Resistance	ohms	2.4				▨		
9.b	Resistance	ohms	2.4				▨		
9.c	Resistance	ohms	2.4				▨		
9.d	Resistance	ohms	7.7				▨		
9.e	Resistance	ohms	11.8				▨		
9.f	Resistance	ohms	2.0				▨		
9.g	Resistance	ohms	2.4				▨		
9.h	Resistance	ohms	2.4				▨		
9.i	Resistance	ohms	2.4				▨		
9.j	Resistance	ohms	7.7				▨		
9.k	Resistance	ohms	11.8				▨		

*** TO BE USED AS REQUIRED OR DESIRED**

REMARKS:

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 **REV.** F **PAGE** 1 **OF** 9

INITIAL TDRR 21539 **D.S. PGS** 4

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION Connect cables and check for continuity and ground isolation. Provides index of GSE operating procedures.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-14-65	22430	-	3	WK	ACM
B	11-3-65	23733	All	All	WK	ACM
C	12-21-65	24815	3	-	WK	-
D	3-8-66	26920	3	-	WK	ACM
E	5-6-66	28577	3, 4, 5	-	MM	ACM
F	10-13-66	31509	4 - 9	-	EA	-

REFERENCES 3-3.11.1.3 through 3-3.11.1.5 of ATP 1026000

IMPORTANT Performance of JDC 10002 required before proceeding with this JDC.

INTERVAL

TOOLS AND MATERIAL Battery Operated Volt-Ohmmeter or Wheatstone Bridge

1. Insure that all JDC's necessary to perform the desired testing are available. Record on data sheet.

2. Insure that all items of test equipment have been calibrated and adjusted in accordance with the applicable Quality Assurance Implementation Plan. Record on data sheet.

3. Insure that G & N System power connectors 56P11 and 56P12 are disconnected from power sources.

4. Insure that:

W96 is not connected to J6, J7, J12 of OIA;

W209 is not connected to J2, J7, J8, J11 of CTS or W207;

W205 is not connected to J4, J5, J6 of Buffer Assembly.

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5. Using Volt-Ohmmeter, measure resistance between following pins:

	GRD SYSTEM	FROM	GRD SYSTEM	TO
a.	0 VDC IMU	56P11-D	structure grd	56P11-L
b.	0 VDC IMU	56P11-D	0 VDC optics	56P11-G
c.	0 VDC IMU	56P11-D	0 VDC AGC	56P11-J
d.	0 VDC IMU	56P11-D	400 115V 10	56P11-K
e.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-E
f.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-F
g.	0 VDC IMU	56P11-D	0 VDC IMU	56P12-D
h.	0 VDC optics	56P11-G	0 VDC optics	56P12-G
i.	0 VDC AGC	56P12-J	0 VDC AGC	56P11-J
j.	structure grd	56P11-L	structure grd	56P12-L
k.	0 VDC IMU	56P11-E	0 VDC IMU	56P12-E
l.	0 VDC IMU	56P11-F	0 VDC IMU	56P12-F
m.	0 VDC Optics	56P11-G	structure grd	56P11-L
n.	0 VDC AGC	56P11-J	0 VDC Optics	56P11-G
o.	0 VDC AGC	56P11-J	structure grd	56P11-L
p.	400-115V Low	56P11-K	structure grd	56P11-L
q.	400-115V Low	56P11-K	0 VDC Optics	56P11-G
r.	400-115V Low	56P11-K	0 VDC AGC	56P11-J

6. With the ATTITUDE IMPULSE CONTROLLER in the positions shown in table 1, make the corresponding resistance measurements. Record indications.

Table 1

	CONTROLLER Position	"A" Resistance	"B" Resistance
a.	ROLL RIGHT	W31-P1 pins x and z	W31-P1 pins y and z
b.	ROLL LEFT	W31-P1 pins x and z	W31-P1 pins y and z
c.	PITCH UP	W31-P1 pins BB and DD	W31-P1 pins CC and DD
d.	PITCH DOWN	W31-P1 pins BB and DD	W31-P1 pins CC and DD
e.	YAW RIGHT	W31-P1 pins EE and GG	W31-P1 pins FF and GG
f.	YAW LEFT	W31-P1 pins EE and GG	W31-P1 pins FF and GG

---

7. Using Volt-Ohmmeter, measure resistance between W31-P1 pins N and P while pressing CHECK CONDITION pushbutton.

8. Using the Volt-Ohmmeter, measure the resistance between point E2 and Facility Ground as shown on Figure 1 or Figure 2 of JDC 10002.

9. Using the Volt-Ohmmeter, measure the resistance between the following pins:

	FROM	TO
a.	56P11-A	56P11-J
b.	56P11-B	56P11-D
c.	56P11-C	56P11-D
d.	56P11-H	56P11-G
e.	56P11-M	56P11-D
f.	56P11-N	56P11-K
g.	56P12-A	56P12-J
h.	56P12-B	56P12-D
i.	56P12-C	56P12-D
j.	56P12-H	56P12-G
k.	56P12-M	56P12-D

10. Insure that the following cables are connected from the GSE to airborne equipment:

Table 2

NOTE: The cable interconnection specified to CTS are necessary only when performing JDC's 10034, 10036 or 10039. If these JDC's are not to be performed, it is not necessary to make the appropriate cable interconnection to the CTS.

GSE - G & N Interconnections

From	Conn. No.		Cable and drawing No.	Conn. No.		To
GSE J Box	J40	P1	W55 (1900999)	P2	P11	56P11
G & N Fixture Cradle	E2	P3				
	E2	P3	W59 (1900997)	P2	P12	56P12
GSE J Box	J46	P1				
OIA	16	P1	W31 (1901302)	P2	J2	AGC/ PSA/ SC Adapter
Buffer assy. (1020307)	J4 J5 J6	P1 P2 P3	W205 (1020270)	P4	A50	AGC
W96	P4	P1	W83 (1901879)	P2	P9	56P9
OIA	J6 J7 J12	P1 P2 P3	W96 (1902347)	P4	P1	W83
CTS	J8 J2 J7 J11	P2 P3 P4 P5	W209 (1020284)	P1	J1	AGC/ PSA/SC Adapter

NOTE: Cable 207 will be connected to J7, J8 of Buffer Assembly at a later time in accordance with specified procedures.

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11. Insure that ALGA and STRT 1, STRT 2 switches on AGC Buffer Assembly are in the ON position and that the CONDITION LAMPS switch on the G & N Indicator Control Panel is in the ON position.

12. When using 100/Block II/LEM OIA, insure that the BLOCK 1 SERIES 100 and G & N TEST CONFIG lamps on the Monitor panel are lighted.

13. The following JDC's are to be used if operating procedures for GSE Commercial test equipment are required during use of all JDC's necessary to perform the desired testing.

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS

Equipment Nomenclature	JDC Description	JDC Number	GSE Equipment Configuration	
			I-100	I-100/II/LEM
Auxiliary input panel	Applying auxiliary signals to digital voltmeter, phase angle voltmeter, dual beam oscilloscope, and counter	18103		X
	Applying PSA test point adapter and PTA/ PEA test point adapter signals to dual beam oscilloscope	18204		X
	Applying PSA test point adapter signals to dual beam oscilloscope	18104		X
	Operation - general	18050		X
Coaxial distribution panel	Applying auxiliary signals from PSA test point adapter to dual beam oscilloscope	18004	X	
Counter	Applying auxiliary signals	18103		X
	Count clock frequency pulses that occur during interval determined by "D" input events	18020	X	X
	Count number of input events that occur during any preselected time interval	18018	X	X
	Count number of input events that occur during interval determined by "D" input events	18019	X	X
	Determine correct operation of N_1 switches, time base circuitry, and count-chain circuitry	18021	X	X

SUBSYSTEM G & N SYSTEM | ASSY

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS (cont)

Equipment Nomenclature	JDC Description	JDC Number	GSE Equipment Configuration	
			I-100	I-100/II/LEM
Counter (cont)	Determine correct operation of N_2 switch	18022	X	X
	Forward or reverse count	18017	X	X
	Performance verification	19261		X
Current source monitor panel	Measure voltages	18016	X	
	Measure voltages	18216		X
Digital recorder	Operation and interpretation of data	18043	X	X
Digital voltmeter	Applying auxiliary signals	18003	X	
	Applying auxiliary signals	18103		X
	Applying internal signals	18000	X	X
	Applying PSA test point adapter test point signals	18002	X	X
	Automatic measurement of ac or dc voltage	18037	X	X
	Measurement of ac voltage	18036	X	
	Measurement of ac voltage	18236		X
	Measurement of dc voltage	18035	X	
	Measurement of dc voltage	18235		X
	Performance verification	19260		X
Dual beam oscilloscope	Adjustment	19362		X
	Adjustment of scope A upper beam vertical plug-in unit	19360		X
	Adjustment of scope B lower beam vertical plug-in unit	19361		X
	Applying auxiliary signals	18003	X	
	Applying auxiliary signals	18004	X	
	Applying auxiliary signals	18103		X
	Applying internal signals	18000	X	X

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SUBSYSTEM G & N SYSTEM | ASSY

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS (cont)

Equipment Nomenclature	JDC Description	JDC Number	GSE Equipment Configuration	
			I-100	I-100/II/LEM
Dual beam oscilloscope (cont)	Applying oscillograph signals to scope "B," channel 2	18011	X	X
	Applying PSA test point adapter and PTA/PEA test point adapter signals	18204		X
	Applying PSA test point adapter signals	18002	X	X
	Applying PSA test point adapter signals	18104		X
	Applying reference signals	18001	X	X
	Applying two signals simultaneously to scope "B"	18010	X	X
	Frequency measurements	18008	X	X
	Performance verification	19263		X
	Phase shift measurements using upper beam differential amplifier	18006	X	X
	Pulse monitoring using scope "B," channel 1	18009	X	X
	Time measurements	18007	X	X
	Voltage measurements using upper beam differential amplifier	18005	X	X
Electrical adapter cable assembly set	Signal monitoring and continuity testing	18051	X	X
Fill and purge fixture	Fill and purge G and N system components	18045	X	X
Galvanometer	Measure voltages	18016	X	
	Measure voltages	18216		X
G and N coolant and power console	Operation and interconnections for G and N system, ISS, and OSS testing	18046	X	X

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SUBSYSTEM G & N SYSTEM | ASSY

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS (cont)

Equipment Nomenclature	JDC Description	JDC Number	GSE Equipment Configuration	
			I-100	I-100/II/LEM
Gimbal position control panel	Operation— general	18044	X	
	Operation - general	18244		X
Inertial components temperature controller	Provide IMU heat	18049	X	X
Oscillograph	Adjustment of dc amplifiers	18025	X	
	Adjustment of dc amplifiers	19363		X
	Adjustment of phase sensitive demodulators	19364		X
	Adjustment of phase sensitive demodulators (800 cps reference)	18027	X	X
	Adjustment of phase sensitive demodulators (3200 cps reference)	18028	X	X
	Applying signals to dual beam oscilloscope scope "B," channel 2	18011	X	X
	Electric writing	18023	X	X
	Ink writing	18024	X	X
	Installation of ink cartridge	18032	X	X
	Installation of ink pen	18033	X	X
	Installation of paper	18034	X	X
	Operation of dc amplifiers	18026	X	X
	Operation of phase sensitive demodulators	18031	X	X
	Performance verification of dc amplifiers	19264		X
	Performance verification of phase sensitive demodulators	19265		X
	Performance verification of phase sensitive demodulators	19268		X
Phase angle voltmeter	Applying auxiliary signals	18003	X	
	Applying auxiliary signals	18103		X
	Applying internal signals	18000	X	X

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SUBSYSTEM G & N SYSTEM | ASSY

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS (cont)

Equipment Nomenclature	JDC Description	JDC Number	GSE Equipment Configuration	
			I-100	I-100/II/LEM
Phase angle voltmeter (cont)	Applying PSA test point adapter signals	18002	X	X
	Indication of phase sensitive null	18042	X	X
	Measurement of fundamental rms voltages	18039	X	X
	Measurement of in-phase and quadrature components	18041	X	X
	Measurement of phase angle	18040	X	X
	Measurement of total rms voltages	18038	X	X
	Performance verification	19262		X
	Performance verification	19266		X
Primary signal selector panel	Applying auxiliary signals through auxiliary input panel to digital voltmeter, phase angle voltmeter, dual beam oscilloscope, and counter	18103		X
	Applying auxiliary signals through PSA test point adapter and coaxial distribution panel to dual beam oscilloscope	18004	X	
	Applying auxiliary signals to digital voltmeter, phase angle voltmeter, and dual beam oscilloscope	18003	X	
	Applying internal signals to digital voltmeter, phase angle voltmeter, and dual beam oscilloscope.	18000	X	X
	Applying PSA test point adapter test point signals and PTA/PEA test point adapter test point signals through auxiliary input panel to dual beam oscilloscope.	18204		X
	Applying PSA test point adapter signals through auxiliary input panel to dual beam oscilloscope	18104		X
	Applying PSA test point adapter signals to dual beam oscilloscope, phase angle voltmeter, and digital voltmeter	18002	X	X

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JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING | JDC 10004 REV F PAGE 9 OF 9

SUBSYSTEM G & N SYSTEM | ASSY

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS (cont)

Equipment Nomenclature	JDC Description	JDC Number	GSE Equipment Configuration	
			I-100	I-100/II/LEM
Primary signal selector panel (cont)	Applying reference signals to dual beam oscilloscope	18001	X	X
	Voltage measurement on dual beam oscilloscope of signals through primary selector panel	18005	X	X
PSA test point adapter	Applying auxiliary signals through primary signal selector panel and coaxial distribution panel to dual beam oscilloscope	18004	X	
	Applying signals through primary signal selector panel to digital voltmeter, phase angle voltmeter, and dual beam oscilloscope	18002	X	X
	Applying signals via auxiliary input panel and primary signal selector panel to dual beam oscilloscope	18104		X
	Applying signals via auxiliary input panel and primary signal selector panel to dual beam oscilloscope (PSA test point adapter and PTA/PEA test point adapter)	18204		X
Signal generator	Adjustment	18012	X	X
	Operation	18013	X	X

DATE ______

FORM 00145
Chg. 7-25-65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 4

JDC
NO. 10004
REV. F
INITIAL TDRR 21539

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NUMBER 1 NECESSARY JDC's (list JDC'S with Revision letter necessary to complete testing as per applicable FTM 1026000 or ND 1021041 for field-site testing.)	Tester's Initials

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 4

JDC
NO. 10004
REV. F

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NUMBER 2 CALIBRATION OF TEST EQUIPMENT:	REJECTED	ACCEPTED
Indicate acceptance or rejection of test equipment calibration as per applicable Quality Assurance Implementation Plan.		

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 4

JDC
NO. 10004
REV. F

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
5.a	Resistance	mego	5.0				infinity		
5.b	Resistance	ohms	1000.0				infinity		
5.c	Resistance	ohms	1000.0				infinity		
5.d	Resistance	mego	5.0				infinity		
5.e	Resistance	ohm	0				0.5		
5.f	Resistance	ohm	0				0.5		
5.g	Resistance	ohm	0				0.5		
5.h	Resistance	ohm	0				0.5		
5.i	Resistance	ohm	0				0.5		
5.j	Resistance	ohm	0				0.5		
5.k	Resistance	ohm	0				0.5		
5.l	Resistance	ohm	0				0.5		
5.m	Resistance	mego	5.0						
5.n	Resistance	ohms	1000.0						
5.o	Resistance	ohms	0				2.0		
5.p	Resistance	mego	5.0						
5.q	Resistance	mego	5.0						
5.r	Resistance	mego	5.0						
6.a	Roll Right A	ohms	0				100		
	Roll Right B	mego	0.1						
6.b	Roll Left A	mego	0.1						
	Roll Left B	ohms	0				100		

* TO BE USED AS REQUIRED OR DESIRED

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 4

JDC
NO. 10004
REV. F

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
6.c	Pitch Up A	ohms	0				100		
	Pitch Up B	mego	0.1						
6.d	Pitch Down A	mego	0.1						
	Pitch Down B	ohms	0				100		
6.e	Yaw Right A	ohms	0				100		
	Yaw Right B	mego	0.1						
6.f	Yaw Left A	mego	0.1						
	Yaw Left B	ohms	0				100		
7	S/C lamp test	ohms	0				2		
8	Resistance	ohms	0				0.5		
9.a	Resistance	ohms	2.4				▨		
9.b	Resistance	ohms	2.4				▨		
9.c	Resistance	ohms	2.4				▨		
9.d	Resistance	ohms	7.7				▨		
9.e	Resistance	ohms	11.8				▨		
9.f	Resistance	ohms	2.0				▨		
9.g	Resistance	ohms	2.4				▨		
9.h	Resistance	ohms	2.4				▨		
9.i	Resistance	ohms	2.4				▨		
9.j	Resistance	ohms	7.7				▨		
9.k	Resistance	ohms	11.8				▨		

* TO BE USED AS REQUIRED OR DESIRED

REMARKS:

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV. G PAGE 1 OF 9
INITIAL TDRR 21539 D.S. PGS 4

SUBSYSTEM G & N SYSTEM
ASSY.

DESCRIPTION Connect cables and check for continuity and ground isolation. Provides index of GSE operating procedures.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	9-14-65	22430	-	3	WK	ACM
B	11-3-65	23733	All	All	WK	ACM
C	12-21-65	24815	3	-	WK	-
D	3-8-66	26920	3	-	WK	ACM
E	5-6-66	28577	3, 4, 5	-	MM	ACM
F	10-13-66	31509	4 - 9	-	EA	-
G	11-17-66	31963	7, 8, 9	-	EA	-

REFERENCES 3-3.11.1.3 through 3-3.11.1.5 of ATP 1026000

IMPORTANT Performance of JDC 10002 required before proceeding with this JDC.

INTERVAL

TOOLS AND MATERIAL Battery Operated Volt-Ohmmeter or Wheatstone Bridge

1. Insure that all JDC's necessary to perform the desired testing are available. Record on data sheet.

2. Insure that all items of test equipment have been calibrated and adjusted in accordance with the applicable Quality Assurance Implementation Plan. Record on data sheet.

3. Insure that G & N System power connectors 56P11 and 56P12 are disconnected from power sources.

4. Insure that:

W96 is not connected to J6, J7, J12 of OIA;

W209 is not connected to J2, J7, J8, J11 of CTS or W207;

W205 is not connected to J4, J5, J6 of Buffer Assembly.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV G PAGE 2 OF 9

SUBSYSTEM G & N SYSTEM
ASSY

5. Using Volt-Ohmmeter, measure resistance between following pins:

	GRD SYSTEM	FROM	GRD SYSTEM	TO
a.	0 VDC IMU	56P11-D	structure grd	56P11-L
b.	0 VDC IMU	56P11-D	0 VDC optics	56P11-G
c.	0 VDC IMU	56P11-D	0 VDC AGC	56P11-J
d.	0 VDC IMU	56P11-D	400 115V 10	56P11-K
e.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-E
f.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-F
g.	0 VDC IMU	56P11-D	0 VDC IMU	56P12-D
h.	0 VDC optics	56P11-G	0 VDC optics	56P12-G
i.	0 VDC AGC	56P12-J	0 VDC AGC	56P11-J
j.	structure grd	56P11-L	structure grd	56P12-L
k.	0 VDC IMU	56P11-E	0 VDC IMU	56P12-E
l.	0 VDC IMU	56P11-F	0 VDC IMU	56P12-F
m.	0 VDC Optics	56P11-G	structure grd	56P11-L
n.	0 VDC AGC	56P11-J	0 VDC Optics	56P11-G
o.	0 VDC AGC	56P11-J	structure grd	56P11-L
p.	400-115V Low	56P11-K	structure grd	56P11-L
q.	400-115V Low	56P11-K	0 VDC Optics	56P11-G
r.	400-115V Low	56P11-K	0 VDC AGC	56P11-J

6. With the ATTITUDE IMPULSE CONTROLLER in the positions shown in table 1, make the corresponding resistance measurements. Record indications.

Table 1

	CONTROLLER Position	"A" Resistance	"B" Resistance
a.	ROLL RIGHT	W31-P1 pins x and z	W31-P1 pins y and z
b.	ROLL LEFT	W31-P1 pins x and z	W31-P1 pins y and z
c.	PITCH UP	W31-P1 pins BB and DD	W31-P1 pins CC and DD
d.	PITCH DOWN	W31-P1 pins BB and DD	W31-P1 pins CC and DD
e.	YAW RIGHT	W31-P1 pins EE and GG	W31-P1 pins FF and GG
f.	YAW LEFT	W31-P1 pins EE and GG	W31-P1 pins FF and GG

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JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV G PAGE 3 OF 9

SUBSYSTEM G & N SYSTEM
ASSY

7. Using Volt-Ohmmeter, measure resistance between W31-P1 pins N and P while pressing CHECK CONDITION pushbutton.

8. Using the Volt-Ohmmeter, measure the resistance between point E2 and Facility Ground as shown on Figure 1 or Figure 2 of JDC 10002.

9. Using the Volt-Ohmmeter, measure the resistance between the following pins:

	FROM	TO
a.	56P11-A	56P11-J
b.	56P11-B	56P11-D
c.	56P11-C	56P11-D
d.	56P11-H	56P11-G
e.	56P11-M	56P11-D
f.	56P11-N	56P11-K
g.	56P12-A	56P12-J
h.	56P12-B	56P12-D
i.	56P12-C	56P12-D
j.	56P12-H	56P12-G
k.	56P12-M	56P12-D

10. Insure that the following cables are connected from the GSE to airborne equipment:

Table 2

NOTE: The cable interconnection specified to CTS are necessary only when performing JDC's 10034, 10036 or 10039. If these JDC's are not to be performed, it is not necessary to make the appropriate cable interconnection to the CTS.

GSE - G & N Interconnections

From	Conn. No.		Cable and drawing No.	Conn. No.		To
GSE J Box	J40	P1	W55 (1900999)	P2	P11	56P11
G & N Fixture Cradle	E2	P3				
	E2	P3	W59 (1900997)	P2	P12	56P12
GSE J Box	J46	P1				
OIA	16	P1	W31 (1901302)	P2	J2	AGC/ PSA/ SC Adapter
Buffer assy. (1020307)	J4 J5 J6	P1 P2 P3	W205 (1020270)	P4	A50	AGC
W96	P4	P1	W83 (1901879)	P2	P9	56P9
OIA	J6 J7 J12	P1 P2 P3	W96 (1902347)	P4	P1	W83
CTS	J8 J2 J7 J11	P2 P3 P4 P5	W209 (1020284)	P1	J1	AGC/ PSA/SC Adapter

NOTE: Cable 207 will be connected to J7, J8 of Buffer Assembly at a later time in accordance with specified procedures.

DATE 12 AUG 65

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV G PAGE 4 OF 9

SUBSYSTEM G & N SYSTEM
ASSY

11. Insure that ALGA and STRT 1, STRT 2 switches on AGC Buffer Assembly are in the ON position and that the CONDITION LAMPS switch on the G & N Indicator Control Panel is in the ON position.

12. When using 100/Block II/LEM OIA, insure that the BLOCK 1 SERIES 100 and G & N TEST CONFIG lamps on the Monitor panel are lighted.

13. The following JDC's are to be used if operating procedures for GSE Commercial test equipment are required during use of all JDC's necessary to perform the desired testing.

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS

Equipment Nomenclature	JDC Description	JDC Number	GSE Equipment Configuration I-100	GSE Equipment Configuration I-100/II/LEM
Auxiliary input panel	Applying auxiliary signals to digital voltmeter, phase angle voltmeter, dual beam oscilloscope, and counter	18103		X
	Applying PSA test point adapter and PTA/PEA test point adapter signals to dual beam oscilloscope	18204		X
	Applying PSA test point adapter signals to dual beam oscilloscope	18104		X
	Operation - general	18050		X
Coaxial distribution panel	Applying auxiliary signals from PSA test point adapter to dual beam oscilloscope	18004	X	
Counter	Applying auxiliary signals	18103		X
	Count clock frequency pulses that occur during interval determined by "D" input events	18020	X	X
	Count number of input events that occur during any preselected time interval	18018	X	X
	Count number of input events that occur during interval determined by "D" input events	18019	X	X
	Determine correct operation of N_1 switches, time base circuitry, and count-chain circuitry	18021	X	X

DATE 12 AUG 65

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS (cont)

Equipment Nomenclature	JDC Description	JDC Number	GSE Equipment Configuration	
			I-100	I-100/II/LEM
Counter (cont)	Determine correct operation of N_2 switch	18022	X	X
	Forward or reverse count	18017	X	X
	Performance verification	19261		X
Current source monitor panel	Measure voltages	18016	X	
	Measure voltages	18216		X
Digital recorder	Operation and interpretation of data	18043	X	X
Digital voltmeter	Applying auxiliary signals	18003	X	
	Applying auxiliary signals	18103		X
	Applying internal signals	18000	X	X
	Applying PSA test point adapter test point signals	18002	X	X
	Automatic measurement of ac or dc voltage	18037	X	X
	Measurement of ac voltage	18036	X	
	Measurement of ac voltage	18236		X
	Measurement of dc voltage	18035	X	
	Measurement of dc voltage	18235		X
	Performance verification	19260		X
Dual beam oscilloscope	Adjustment	19362		X
	Adjustment of scope A upper beam vertical plug-in unit	19360		X
	Adjustment of scope B lower beam vertical plug-in unit	19361		X
	Applying auxiliary signals	18003	X	
	Applying auxiliary signals	18004	X	
	Applying auxiliary signals	18103		X
	Applying internal signals	18000	X	X

DATE ________

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS (cont)

Equipment Nomenclature	JDC Description	JDC Number	GSE Equipment Configuration	
			I-100	I-100/II/LEM
Dual beam oscilloscope (cont)	Applying oscillograph signals to scope "B," channel 2	18011	X	X
	Applying PSA test point adapter and PTA/PEA test point adapter signals	18204		X
	Applying PSA test point adapter signals	18002	X	X
	Applying PSA test point adapter signals	18104		X
	Applying reference signals	18001	X	X
	Applying two signals simultaneously to scope "B"	18010	X	X
	Frequency measurements	18008	X	X
	Performance verification	19263		X
	Phase shift measurements using upper beam differential amplifier	18006	X	X
	Pulse monitoring using scope "B," channel 1	18009	X	X
	Time measurements	18007	X	X
	Voltage measurements using upper beam differential amplifier	18005	X	X
Electrical adapter cable assembly set	Signal monitoring and continuity testing	18051	X	X
Fill and purge fixture	Fill and purge G and N system components	18045	X	X
Galvanometer	Measure voltages	18016	X	
	Measure voltages	18216		X
G and N coolant and power console	Operation and interconnections for G and N system, ISS, and OSS testing	18046	X	X

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INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS (cont)

Equipment Nomenclature	JDC Description	JDC Number	GSE Equipment Configuration	
			I-100	I-100/II/LEM
Gimbal position control panel	Operation - general	18044	X	
	Operation - general	18244		X
GSE power supplies	Performance verification	19259		X
Gyro caging electronics panel	Performance verification	19256		X
IMU shipping container	Dial and maximum-minimum thermometers comparative checkout	19822		X
Inertial components temperature controller	Provide IMU heat	18049	X	X
Monitor panel	Performance verification	19252		X
Oscillograph	Adjustment of dc amplifiers	18025	X	
	Adjustment of dc amplifiers	19363		X
	Adjustment of phase sensitive demodulators	19364		X
	Adjustment of phase sensitive demodulators (800 cps reference)	18027	X	X
	Adjustment of phase sensitive demodulators (3200 cps reference)	18028	X	X
	Applying signals to dual beam oscilloscope scope "B", channel 2	18011	X	X
	Electric writing	18023	X	X
	Ink writing	18024	X	X
	Installation of ink cartridge	18032	X	X
	Installation of ink pen	18033	X	X
	Installation of paper	18034	X	X
	Operation of dc amplifiers	18026	X	X
	Operation of phase sensitive demodulators	18031	X	X

DATE ________

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS (cont)

Equipment Nomenclature	JDC Description	JDC Number	GSE Equipment Configuration	
			I-100	I-100/II/LEM
Oscillograph (cont)	Performance verification of dc amplifiers	19264		X
	Performance verification of phase sensitive demodulators	19265		X
	Performance verification of phase sensitive demodulators	19268		X
	Verification of chart speed	19251		X
Oscillograph signal selector panel	Performance verification	19254		X
Phase angle voltmeter	Applying auxiliary signals	18003	X	
	Applying auxiliary signals	18103		X
	Applying internal signals	18000	X	X
	Applying PSA test point adapter signals	18002	X	X
	Indication of phase sensitive null	18042	X	X
	Measurement of fundamental rms voltages	18039	X	X
	Measurement of in-phase and quadrature components	18041	X	X
	Measurement of phase angle	18040	X	X
	Measurement of total rms voltages	18038	X	X
	Performance verification	19262		X
	Performance verification	19266		X
Power supply and load panel	Performance verification	19253		X
Primary signal selector panel	Applying auxiliary signals through auxiliary input panel to digital voltmeter, phase angle voltmeter, dual beam oscilloscope, and counter	18103		X
	Applying auxiliary signals through PSA test point adapter and coaxial distribution panel to dual beam oscilloscope	18004	X	
	Applying auxiliary signals to digital voltmeter, phase angle voltmeter, and dual beam oscilloscope	18003	X	

DATE ________

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING | JDC 10004 REV G PAGE 9 OF 9

SUBSYSTEM G & N SYSTEM | ASSY

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS (cont)

Equipment Nomenclature	JDC Description	JDC Number	GSE Equipment Configuration I-100	I-100/II/LEM
Primary signal selector panel (cont)	Applying internal signals to digital voltmeter, phase angle voltmeter, and dual beam oscilloscope.	18000	X	X
	Applying PSA test point adapter test point signals and PTA/PEA test point adapter test point signals through auxiliary input panel to dual beam oscilloscope.	18204		X
	Applying PSA test point adapter signals through auxiliary input panel to dual beam oscilloscope	18104		X
	Applying PSA test point adapter signals to dual beam oscilloscope, phase angle voltmeter, and digital voltmeter	18002	X	X
	Applying reference signals to dual beam oscilloscope	18001	X	X
	Performance verification	19257		X
	Voltage measurement on dual beam oscilloscope of signals through primary selector panel	18005	X	X
PSA test point adapter	Applying auxiliary signals through primary signal selector panel and coaxial distribution panel to dual beam oscilloscope	18004	X	
	Applying signals through primary signal selector panel to digital voltmeter, phase angle voltmeter, and dual beam oscilloscope	18002	X	X
	Applying signals via auxiliary input panel and primary signal selector panel to dual beam oscilloscope	18104		X
	Applying signals via auxiliary input panel and primary signal selector panel to dual beam oscilloscope (PSA test point adapter and PTA/PEA test point adapter)	18204		X
Signal generator	Adjustment	18012	X	X
	Operation	18013	X	X

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 4

JDC
NO. 10004
REV. G
INITIAL TDRR 21539

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NUMBER 1 NECESSARY JDC's (list JDC'S with Revision letter necessary to complete testing as per applicable FTM 1026000 or ND 1021041 for field-site testing.)	Tester's Initials

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 4

JDC
NO. 10004
REV. G

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NUMBER 2 CALIBRATION OF TEST EQUIPMENT:	REJECTED	ACCEPTED
Indicate acceptance or rejection of test equipment calibration as per applicable Quality Assurance Implementation Plan.		

REMARKS:

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 4

JDC
NO. 10004
REV. G

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES 1st	2nd*	3rd*	MAX VALUE	REJ	ACC
5.a	Resistance	mego	5.0				infinity		
5.b	Resistance	ohms	1000.0				infinity		
5.c	Resistance	ohms	1000.0				infinity		
5.d	Resistance	mego	5.0				infinity		
5.e	Resistance	ohm	0				0.5		
5.f	Resistance	ohm	0				0.5		
5.g	Resistance	ohm	0				0.5		
5.h	Resistance	ohm	0				0.5		
5.i	Resistance	ohm	0				0.5		
5.j	Resistance	ohm	0				0.5		
5.k	Resistance	ohm	0				0.5		
5.l	Resistance	ohm	0				0.5		
5.m	Resistance	mego	5.0						
5.n	Resistance	ohms	1000.0						
5.o	Resistance	ohms	0				2.0		
5.p	Resistance	mego	5.0						
5.q	Resistance	mego	5.0						
5.r	Resistance	mego	5.0						
6.a	Roll Right A	ohms	0				100		
	Roll Right B	mego	0.1						
6.b	Roll Left A	mego	0.1						
	Roll Left B	ohms	0				100		

* TO BE USED AS REQUIRED OR DESIRED

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 4

JDC
NO. 10004
REV. G

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
6.c	Pitch Up A	ohms	0				100		
	Pitch Up B	mego	0.1						
6.d	Pitch Down A	mego	0.1						
	Pitch Down B	ohms	0				100		
6.e	Yaw Right A	ohms	0				100		
	Yaw Right B	mego	0.1						
6.f	Yaw Left A	mego	0.1						
	Yaw Left B	ohms	0				100		
7	S/C lamp test	ohms	0				2		
8	Resistance	ohms	0				0.5		
9.a	Resistance	ohms	2.4				▨		
9.b	Resistance	ohms	2.4				▨		
9.c	Resistance	ohms	2.4				▨		
9.d	Resistance	ohms	7.7				▨		
9.e	Resistance	ohms	11.8				▨		
9.f	Resistance	ohms	2.0				▨		
9.g	Resistance	ohms	2.4				▨		
9.h	Resistance	ohms	2.4				▨		
9.i	Resistance	ohms	2.4				▨		
9.j	Resistance	ohms	7.7				▨		
9.k	Resistance	ohms	11.8				▨		

*** TO BE USED AS REQUIRED OR DESIRED**

REMARKS:

DATE 12 AUG 65

TDRR 21539 AUG 12

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV. - PAGE 1 OF 5
INITIAL TDRR - D.S. PGS 4

SUBSYSTEM G & N SYSTEM
ASSY.

DESCRIPTION Connect cables and check for continuity and ground isolation. Provides index of GSE operating procedures.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES 3-3.11.1.3 through 3-3.11.1.5 of ATP 1026000

IMPORTANT Performance of JDC 10002 required before proceeding with this JDC.

INTERVAL

TOOLS AND MATERIAL Battery Operated Volt-Ohmmeter or Wheatstone Bridge

1. Insure that all JDC's necessary to perform the desired testing are available. Record on data sheet.

2. Insure that all items of test equipment have been calibrated and adjusted in accordance with the applicable Quality Assurance Implementation Plan. Record on data sheet.

3. Insure that G & N System power connectors 56P11 and 56P12 are disconnected from power sources.

4. Insure that:

W96 is not connected to J6, J7, J12 of OIA;

W209 is not connected to J2, J7, J8, J11 of CTS or W207;

W205 is not connected to J4, J5, J6 of Buffer Assembly.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ________

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV - PAGE 2 OF 5

SUBSYSTEM G & N SYSTEM
ASSY

5. Using Volt-Ohmmeter, measure resistance between following pins:

	GRD SYSTEM	FROM	GRD SYSTEM	TO
a.	0 VDC IMU	56P11-D	structure grd	56P11-L
b.	0 VDC IMU	56P11-D	0 VDC optics	56P11-G
c.	0 VDC IMU	56P11-D	0 VDC AGC	56P11-J
d.	0 VDC IMU	56P11-D	400 115V 10	56P11-K
e.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-E
f.	0 VDC IMU	56P11-D	0 VDC IMU	56P11-F
g.	0 VDC IMU	56P11-D	0 VDC IMU	56P12-D
h.	0 VDC optics	56P11-G	0 VDC optics	56P12-G
i.	0 VDC AGC	56P12-J	0 VDC AGC	56P11-J
j.	structure grd	56P11-L	structure grd	56P12-L
k.	0 VDC IMU	56P11-E	0 VDC IMU	56P12-E
l.	0 VDC IMU	56P11-F	0 VDC IMU	56P12-F
m.	0 VDC Optics	56P11-G	structure grd	56P11-L
n.	0 VDC AGC	56P11-J	0 VDC Optics	56P11-G
o.	0 VDC AGC	56P11-J	structure grd	56P11-L
p.	400-115V Low	56P11-K	structure grd	56P11-L
q.	400-115V Low	56P11-K	0 VDC Optics	56P11-G
r.	400-115V Low	56P11-K	0 VDC AGC	56P11-J

6. With the ATTITUDE IMPULSE CONTROLLER in the positions shown in table 1, make the corresponding resistance measurements. Record indications.

Table 1

	CONTROLLER Position	"A" Resistance	"B" Resistance
a.	ROLL RIGHT	W31-P1 pins X and Z	W31-P1 pins Y and Z
b.	ROLL LEFT	W31-P1 pins X and Z	W31-P1 pins Y and Z
c.	PITCH UP	W31-P1 pins BB and DD	W31-P1 pins CC and DD
d.	PITCH DOWN	W31-P1 pins BB and DD	W31-P1 pins CC and DD
e.	YAW RIGHT	W31-P1 pins EE and GG	W31-P1 pins FF and GG
f.	YAW LEFT	W31-P1 pins EE and GG	W31-P1 pins FF and GG

DATE ________

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV - PAGE 3 OF 5

SUBSYSTEM G & N SYSTEM
ASSY

7. Using Volt-Ohmmeter, measure resistance between W31-P1 pins N and P while pressing CHECK CONDITION pushbutton.

8. Using the Volt-Ohmmeter, measure the resistance between point E2 and Facility Ground as shown on Figure 1 or Figure 2 of JDC 10002.

9. Using the Volt-Ohmmeter, measure the resistance between the following pins:

	FROM	TO
a.	56P11-A	56P11-J
b.	56P11-B	56P11-D
c.	56P11-C	56P11-D
d.	56P11-H	56P11-G
e.	56P11-M	56P11-D
f.	56P11-N	56P11-K
g.	56P12-A	56P12-J
h.	56P12-B	56P12-D
i.	56P12-C	56P12-D
j.	56P12-H	56P12-G
k.	56P12-M	56P12-D

10. Insure that the following cables are connected from the GSE to airborne equipment:

Table 2

NOTE: The cable interconnection specified to CTS are necessary only when performing JDC's 10034, 10036 or 10039. If these JDC's are not to be performed, it is not necessary to make the appropriate cable interconnection to the CTS.

GSE - G & N Interconnections

From	Conn. No.		Cable and drawing No.	Conn. No.		To
GSE J Box	J40	P1	W55 (1900999)	P2	P11	56P11
G & N Fixture Cradle	E2					
	E2		W59 (1900997)	P2	P12	56P12
GSE J Box	J46	P1				
OIA	J6	P1	W31 (1901302)	P2	J2	AGC/ PSA/ SC Adapter
Buffer assy. (1020307)	J4 J5 J6	P1 P2 P3	W205 (1020270)	P4	J2	05A7J2
W96	P4	P1	W83 (1901879)	P2	P9	56P9
OIA	J6 J7 J12	P1 P2 P3	W96 (1902347)	P4	P1	W83
CTS	J8 J2 J7 J11	P2 P3 P4 P5	W209 (1020284)	P1	J1	AGC/ PSA/SC Adapter

NOTE: Cable 207 will be connected to J7, J8 of Buffer Assembly at a later time in accordance with specified procedures.

DATE ________

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC 10004 REV - PAGE 4 OF 5

SUBSYSTEM G & N SYSTEM
ASSY

11. Insure that ALGA and STRT 1, STRT 2 switches on AGC Buffer Assembly are in the ON position and that the CONDITION LAMPS switch on the G & N Indicator Control Panel is in the ON position.

12. The following JDC's are to be used if operating procedures for GSE Commercial test equipment are required during use of all JDC's necessary to perform the desired testing.

INDEX FOR COMMERCIAL EQUIPMENT JDC OPERATING INSTRUCTIONS

JDC NO.	JOB
18000	Applying Inertial Signals via the Primary Signal Selector Panel
18001	Applying Reference Signals to the Dual Beam Oscilloscope via the Primary Signal Selector Panel
18002	Applying PSA Test Point Adapter Test Point Signals to the Digital Voltmeter, Phase Angle Voltmeter, and Dual Beam Oscilloscope
18003	Applying Auxiliary Signals via the Primary Signal Selector Panel
18004	Applying Auxiliary Coaxial Signals via the Coaxial Distribution Panel
18005	Voltage Measurement - Dual Beam Oscilloscope
18006	Phase Shift Measurements - Dual Beam Oscilloscope
18007	Time Measurements - Dual Beam Oscilloscope
18008	Frequency Measurements - Dual Beam Oscilloscope
18009	Lower Beam (B Scope, Channel 1) Pulse Monitoring - Dual Beam Oscilloscope
18010	Lower Beam (B Scope) Channel 1 and 2 Monitoring - Dual Beam Oscilloscope
18011	Applying Oscillograph Signals to the Dual Beam Oscilloscope
18012	DC Balance Calibration of Signal Generator
18013	Operation of the Signal Generator
18016	Voltage Measurement with the Current Source Monitor and Galvanometer Voltmeter or JDC 00160, Pulse Torque Electronics Tests.
18017	Count Function - Counter
18018	E/UT XN_1 Function - Counter
18019	Ratio Function - Counter
18020	Period Function - Counter
18021	Test N_1 Function - Counter
18022	Test N_2 Function - Counter
18023	Operation of Oscillograph Console (Electric)
18024	Operation of Oscillograph Console (Ink)

DATE ________

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING	JDC 10004 REV - PAGE 5 OF 5
SUBSYSTEM G & N SYSTEM	ASSY

JDC NO.	JOB
18025	Calibration of DC Amplifier - Oscillograph
18026	Operation of DC Amplifiers - Oscillograph
18027	Normal Calibration (800 CPS Reference) of the Phase Sensitive Demodulator - Oscillograph
18028	Normal Calibration (3200 CPS Reference) of the Phase Sensitive Demodulator-Oscillograph
18029	Periodic Phase Shift Check and Calibration (800 CPS Reference) of the Phase Sensitive Demodulator-Oscillograph
18031	Operation of the Phase Sensitive Demodulator - Oscillograph
18032	Ink Cartridge Installation - Oscillograph
18033	Pen Installation - Oscillograph
18034	Change Paper - Oscillograph
18035	DC Voltage Measurement - Digital Voltmeter
18036	AC Voltage Measurement - Digital Voltmeter
18037	Automatic Measurement of an AC or DC Voltage - Digital Voltmeter
18038	Measurement of a Total RMS Voltage - Phase Angle Voltmeter
18039	Measurement of a Fundamental RMS Component - Phase Angle Voltmeter
18040	Measurement of a Phase Angle - Phase Angle Voltmeter
18041	Measurement of In-Phase and Quadrature Components - Phase Angle Voltmeter
18042	Indication of a Phase Sensitive Null - Phase Angle Voltmeter
18043	Operation of the Digital Recorder
18044	Gimbal Position Control Panel Operation and Calibration (Inertial Subsystem Test Only)
18045	Operation of Purging and Filling Fixture
18046	G & N Coolant and Power Console Operation and Interconnections

DATE ________

TDRR 21539 AUG 12 1965

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 4

JDC
NO. 10004
REV. -
INITIAL TDRR -

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

ASSEMBLY UNDER TEST

TITLE ________
SER. NO. ________ DWG ________ REV. ________

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ CAL DATE
NAME ________ SER. NO. ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

JDC ITEM NUMBER 1 NECESSARY JDC's (list JDC'S with Revision letter necessary to complete testing as per applicable FTM 1026000 or ND 1021041 for field-site testing.)	Testor's Initials

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 4

JDC
NO. 10004
REV. -

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NUMBER 2 CALIBRATION OF TEST EQUIPMENT:	REJECTED	ACCEPTED
Indicate acceptance or rejection of test equipment calibration as per applicable Quality Assurance Implementation Plan.		

REMARKS:

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 4

JDC
NO. 10004
REV. -

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
5.a	Resistance	mego	5.0				infinity		
5.b	Resistance	ohms	1000.0				infinity		
5.c	Resistance	ohms	1000.0				infinity		
5.d	Resistance	mego	5.0				infinity		
5.e	Resistance	ohm	0				0.5		
5.f	Resistance	ohm	0				0.5		
5.g	Resistance	ohm	0				0.5		
5.h	Resistance	ohm	0				0.5		
5.i	Resistance	ohm	0				0.5		
5.j	Resistance	ohm	0				0.5		
5.k	Resistance	ohm	0				0.5		
5.l	Resistance	ohm	0				0.5		
5.m	Resistance	mego	5.0						
5.n	Resistance	ohms	1000.0						
5.o	Resistance	mego	1.0						
5.p	Resistance	mego	5.0						
5.q	Resistance	mego	5.0						
5.r	Resistance	mego	5.0						
6.a	Roll Right A	ohms	0				100		
	Roll Right B	mego	0.1						
6.b	Roll Left A	mego	0.1						
	Roll Left B	ohms	0				100		

* TO BE USED AS REQUIRED OR DESIRED

REMARKS:

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 4

JDC
NO. 10004
REV. -

JOB PREPARE GSE FOR G & N SYSTEM ACCEPTANCE TESTING

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
6.c	Pitch Up A	ohms	0				100		
	Pitch Up B	mego	0.1						
6.d	Pitch Down A	mego	0.1						
	Pitch Down B	ohms	0				100		
6.e	Yaw Right A	ohms	0				100		
	Yaw Right B	mego	0.1						
6.f	Yaw Left A	mego	0.1						
	Yaw Left B	ohms	0				100		
7	S/C lamp test	ohms	0				2		
8	Resistance	ohms	0				0.5		
9.a	Resistance	ohms	2.4				▨		
9.b	Resistance	ohms	2.4				▨		
9.c	Resistance	ohms	2.4				▨		
9.d	Resistance	ohms	7.7				▨		
9.e	Resistance	ohms	11.8				▨		
9.f	Resistance	ohms	2.0				▨		
9.g	Resistance	ohms	2.4				▨		
9.h	Resistance	ohms	2.4				▨		
9.i	Resistance	ohms	2.4				▨		
9.j	Resistance	ohms	7.7				▨		
9.k	Resistance	ohms	11.8				▨		

* TO BE USED AS REQUIRED OR DESIRED

REMARKS:

DATE ________

TDRR 10841 JUL 7 1964

JOB:[1] ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

JDC:[4] 10005 REV:[5] A PAGE[6] 1 OF 7

INITIAL TDRR:[12] 05:68 DS PGS:[13]

SUBSYSTEM:[2] G & N SYSTEM

ASSY:[7]

DESCRIPTION:[3] Assembly of Guidance Components into a complete G & N System Test Configuration and preparation of GSE and G&N System for acceptance testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	7/7/64	10841	7		WR	

REFERENCES:[10]

IMPORTANT:[11] See below.

INTERVAL:[8]

TOOLS AND[9] MATERIAL: See below.

Tools and Material: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended may be substituted.

Item No.	Number Req'd.	Description
1	1 Set	A set of torque wrenches with a range of 1-250 inch pounds with adapters.
2	1	PSA Toe Cap P/N 1008139
3	1	IMU and Optics Navigation Base Ass'y. Sling.

IMPORTANT: The G&N System must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G&N system and components. Performance of this JDC requires 3 men.

A. SAFETY REQUIREMENTS

1. All circuit breakers supplying power to G&N equipment shall be in the OFF position.

2. All signal carrying circuits beginning, terminating, or going thru the G&N equipment shall be de-energized.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE ________

TDRR 10841 JUL 7 1964

JOB: ASSEMBLY AND PREPARATION OF G&N SYSTEM FOR TESTING

JDC: 10005 REV: A PAGE 2 OF 7

SUBSYSTEM: G & N SYSTEM

ASSY

3. All tools shall be in proper operating condition.

4. A thorough visual examination of all equipment shall be performed to detect possible physical damage and to check for sharp edges and abrasion points which could be hazardous to personnel installing G&N equipment as well as to cable bundles, harnesses and connectors.

B. PROCEDURES

NOTE: All directions given are for a technician facing south in front of the G&N Mounting Fixture.

GSE-GSE Connections

1. Place Prime Power Circuit Breaker located on the back of the OIA console to OFF.

2. Insure that the following cables are connected:

Cable No.	From	To
W1	OIA J1	OSC CON J1
W2	OIA J2	OSC CON J2
W3	OIA J3	OSC CON J3
W4	OIA J4	OSC CON J4
W19	OIA J20	Coolant & PWR CON J3
W22	OIA J23	CTS J5
W26	OIA A30J1	Wall Power
W27	OIA A30J2	Coolant & PWR CON J1
W29	Coolant & PWR CON J4	GSE J Box J6
PWR	CTS	Wall Power
W25	OIA J26	GSE J Box Emergency Power Cable
W15	OIA J16	GSE J Box J4

Installation of PSA End Connector and Cable Harness (1007101)

3. Remove all screws holding the End Connector to the PSA End Connector and Cable Harness Handling Fixture.

4. Pick up the PSA End Connector and Cable Harness Handling Fixture and place it as far back as possible in the G&N Mounting Fixture.

5. Release the clamps holding the CDU wire trunk and the DSKY wire trunk.

6. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G&N Mounting Fixture as the PSA End Connector and Harness Trunk Handling Fixture is moved forward. When the End Connector is in its approximate position, set the PSA End Connector and Cable Harness Handling Fixture down.

7. Release all other clamps holding harness trunks.

8. With two men supporting harness trunks and the End Connector, remove the PSA End Connector and Cable Harness Handling Fixture.

DATE ________

TDRR 10841 JUL 7 1964

JOB: ASSEMBLY AND PREPARATION OF G&N SYSTEM FOR TESTING

JDC: 10005 REV: A PAGE 3 OF 7

SUBSYSTEM: G&N SYSTEM

ASSY

9. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G&N Mounting Fixture.

10. Place PSA End Connector over mounting hole in G&N Mounting Fixture Cradle.

11. Install 6 10-32, 1-3/8 inch socket head screws through the bottom of the G&N Mounting Fixture Cradle into the PSA End Connector screw receptacles to secure the PSA End Connector in the G&N Mounting Fixture Cradle. Torque screws to 5-inch pounds.

12. Remove CDU mounting frame from G&N Mounting Fixture and install and secure CDU connectors 56J2, 56J1, 56J3, 56J4 and 56J5 in the listed order to the CDU Mounting Frame using special studs P/N1016889 and flex lock nuts P/N AN365D-440 torqued to 5 inch-pounds. Install CDU's and frame to the G&N Mounting Fixture.

13. Secure upper clamp to the J5, J4 harness and the lower clamp to the J3, J2, J1 harness torquing the clamp bolts to 15 inch pounds.

14. Secure left D&C Harness Trunk (upper trunk) to left side of G&N Mounting Fixture Cradle torquing clamp bolts to 15 inch-pounds. Tilt G&N Mounting Fixture to 0°.

Installation of G&N AGC DSKY

15. Install and secure AGC DSKY on upper right frame of G&N Mounting Fixture Cradle. Guide pins will insure proper positioning of DSKY.

15. (Continued) Torque eight captive bolts to 10 inch-pounds.

16. Hold and support 56J10 and screw AGC DSKY connector screw into 56J10 torquing the screw to 7 inch-pounds.

17. Secure right D&C Harness Trunk (upper trunk) to right side of G&N Mounting Fixture Cradle torquing the clamp bolt to 10 inch-pounds.

Installation of IMU Control Panel

18. Install and secure IMU Control Panel in upper left frame of G&N Mounting Fixture Cradle. Guide pins insure proper position of IMU Control Panel. Torque four captive screws to 10 inch-pounds.

19. Hold and support connector 56J6 and screw IMU Control Panel Connector screw into 56J6 torquing it to 7 inch-pounds.

20. Secure left D&C Harness Trunk (upper trunk) to right side of G&N Mounting Fixture Cradle torquing the clamp bolt to 10 inch-pounds.

21. Secure Map and Data Viewer and IMU Control Panel Trunk with its clamp at the upper left top of the G&N Mounting Fixture Cradle torquing the clamp bolt to 15 inch-pounds.

Installation of Optics Navigation Base

22. Rotate G&N Mounting Fixture Cradle to approximately horizontal or 90° position.

23. Install complete Lower Ball Mount, P/N 1900580 from the G&N Mounting Fixture onto the Optics Navigation Base Assembly torquing the bolts to 10 inch-pounds.

24. Install four eye bolts in the Optics Navigation Base Handling Fixture.

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SUBSYSTEM: G&N SYSTEM

ASSY

25. Attach the sling to the monorail hoist.

26. Attach the sling to the four eye bolts on the Optics Navigation Base Handling Fixture. Adjust the sling so that the Optics Navigation Base is horizontal when suspended.

27. Carefully examine the mating surfaces of the Optics Navigation Base and the G&N Mounting Fixture frame to insure that they are clean and free from burrs.

28. Slowly and carefully move the Optics Navigation Base Assembly over and then around the 'fanned out' cable harness of the PSA-EC.

29. When the mounting holes in the bottom Kinematic Mount are approximately lined up with the corresponding holes in the G&N Mounting Fixture, install the bolts finger tight.

30. When the mounting holes in the top left and right kinematic mounts are approximately lined up with the corresponding holes in the G&N Mounting Fixture, install the bolts finger tight.

31. Torque all bolts in 5 inch-pound increments until all bolts are torqued to 15 inch-pounds.

32. Secure left hand IMU Optics Cable Harness to the Optics Navigation Base.

33. Secure right hand IMU Optics Cable Harness to the Optics Navigation Base.

34. Remove the Optics Navigation Base Handling Fixture, P/N 1901426 from the Optics Navigation Base Assembly.

Installation of D&C Electronics

35. Obtain D&C Electronics. Lift it up until the mounting holes line up with the corresponding insert holes in the left hand structural support panel. Insert four screws and torque them to 10 inch-pounds.

36. Mate connector 56P1 to connector 50A3J1 on the D&C Electronics. Torque jacking screw to 7 inch-pounds.

Installation of Control Electronics

37. Obtain the Control Electronics Assembly and mount it on the right hand structural support with the four screws. Torque the screws to 10 inch-pounds.

38. Mate connector 56P10 to connector 50A4J1 on the Control Electronics Assembly. Torque the jacking screw to 7 inch-pounds.

Installation of the IMU

39. Insure that the Portable Temperature Controller is attached to the IMU and is operating properly. See that the extension cable is coiled neatly, with no tangles so that it can be played out smoothly. Allow the IMU to cool to room temperature for 1 hour before installing in the G&N Mounting Fixture.

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INCHES
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JOB: ASSEMBLY AND PREPARATION OF G&N SYSTEM FOR TESTING

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SUBSYSTEM: G&N SYSTEM

ASSY

40. Carefully examine the Optics Navigation Base IMU mounting surfaces to insure that they are clean and free from burrs.

41. Install the four eye bolts to the IMU.

42. Attach the sling to the four eye bolts on the IMU.

43. Carefully hoist the IMU and position it above the G&N Mounting Fixture.

44. Transfer and lower the IMU into position so that the IMU mounting pads are approximately lined up with the Optics Navigation Base mounting pads.

45. Lower the IMU slowly insuring that the guide pins line up with the guide holes on the IMU mounting surface.

46. Lower the IMU into its final position.

47. Remove the sling and eye bolts from the IMU.

48. Torque the four IMU bolts finger tight. Measure the breakaway torque. Add 150 inch-pounds to the breakaway torque and this is the value the IMU bolts must be torqued to.

49. Torque the four IMU bolts to calculated torque in 25 inch-pound increments in the following sequence. Torque bolt in hole with locating pin first. Second torque bolt diagonally across from it. Third torque bolt in the slot. Fourth torque bolt diagonally across from it.

50. Fasten connector 56P5 on the end of the left hand cable to the Sextant connector 10J1.

51. Fasten connector 56P4 on the end of the left hand cable to the Sextant electronics package connector 10J2. Alternatively, tighten each screw two turns until both are torqued to 10 inch-pounds.

52. Fasten connector 56P8 on the end of the right hand cable to the Scanning Telescope connector 20J1.

53. Mate the connectors 56P2, 56P7 and 56P3 on cable to IMU connectors 35J1, 35J4 and 35J3. (Note: Connector 35J2 is not mated at this time because heaters must remain attached to power thru the portable temperature controller until power can be supplied by the GSE thru Tray 7 of the PSA.)

54. Obtain Flexible Hose Assembly Optics Base to IMU P/N 1001471 and connect from IMU Coolant Exit Fitting to the Optics Coolant Fitting.

55. Connect the Flexible Hose Assembly from the IMU Coolant Supply to the inlet and exit valves of the IMU and Optics coolant circuit.

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JOB: ASSEMBLY AND PREPARATION OF G&N SYSTEM FOR TESTING

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SUBSYSTEM: G&N SYSTEM

ASSY

56. Rotate the G&N Mounting Fixture Cradle to vertical or 0 degrees position.

Installation of PSA Trays

57. Place PSA Toe Cap P/N 1008135 into position. Use PSA Toe Cap Fixture to determine proper spacing. Torque the four bolts to 10 inch-pounds.

58. Obtain PSA Trays 1 thru 10 and ins insert in reverse sequence starting with Tray 10 using left hand to guide rear tongue into its slot and assist in mating the connectors. In turn, engage the captivated screws into toe plate inserts and torque each screw to 20 inch-pounds.

59. Mate connector W18-P2 with connector 45A7J2 torquing the captivated screw to 10 inch-pounds.

60. Connect Flexible Hose Assembly from the PSA Coolant Supply to the inlet and exit valves on the PSA cold plate.

Installation of CDU's

61. Obtain the five CDU Assemblies and insert them into place in sequence starting with the top and working down. Insert the tongue in the slot at the rear and then engage and torque the captivated jacking screws to 40 inch-pounds.

62. Obtain the CDU cover panel and fasten it in place over the CDU module boxes torquing the six captivated screws to 10 inch-pounds.

Installation of the Map and Data Viewer

63. Obtain the Map and Data Viewer and place it on the G&N Mounting Fixture insuring that the two guide pins enter the guide holes. Torque all four screws to 10 inch-pounds.

64. Mate connector 56J8 to connector P1. Open up the cartridge door and engage torque wrench in the socket head cap screw in the center of the connector. Torque the jacking screw to 7 inch-pounds.

65. Mount signal conditioning cable connector 56P9 to its bracket on the inside right hand wall of the G&N Mounting Fixture. Torque all screws to 10 inch-pounds.

66. Connect cable W32 to connector 56P9. Torque jacking screw to 7 inch-pounds. Do not connect the other end of cable W32 to OIA connectors J6, J7 and J12 at this time.

67. Install Optical Shroud. Torque 6 bolts to 10 inch-pounds.

Installation of AGC

68. Pick up the AGC by its handling fixture and slide it into the G&N Mounting Fixture. Torque the holding screws to 10 inch-pounds.

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SUBSYSTEM: G&N SYSTEM

ASSY:

69. Mate connector 05A3P1 to connector 56J21 and connector 05A3P2 to 56J22. Torque both jacking screws to 7 inch-pounds.

70. Connect the Flexible Hose Ass'y from the AGC coolant supply to the inlet and exit valves of the AGC cold plate.

Installation of Main Panel DSKY

71. Install the Main Panel DSKY Stand in its place.

72. Mount the Main Panel DSKY on the stand torquing all screws to 10 inch-pounds.

73. Obtain cables W50 and W52. Mate connector W50P1 to connectors 05A3J1 and 05A3J2. Mate connector W50J1 to W52P2. Mate connector W52P1 to Main Panel DSKY connector 05A6P1. Torque all jacking screws to 7 inch-pounds.

Power Turn On of OIA

74. Place the Prime Power Circuit Breakers on the back of the OIA Coolant Supply and Oscillograph Consoles to ON.

75. Remove connector P3 (alarm cable) from the Portable Temperature Controller (PTC).

76. Set PTC Power Switch to OFF.

77. Remove PTC Power Cable connector P2 from connector J2 on the IMU.

78. Connect G&N System Harness cable connector 56P2 to connector J2 on the IMU.

79. Apply power to the TEMPERATURE MONITOR CONTROL panel by pressing the 115V 60 cps CONTROL SWITCH.

80. Set the ALARM INHIBIT switch on the back of the MONITOR PANEL to ALARM ENABLE.

81. Set the MONITOR METER SELECT switch to CONT HTR CURRENT and record heater current as indicated on the MONITOR METER.

Installation of the G&N Indicator-Control Panel

82. Position the G&N Indicator Control Panel near its mounting surface on the G&N Mounting Fixture. Reach underneath and mate connector 56J9 to connector 50A1P1. Torque jacking screw on the front of the G&N Indicator Panel to 7 inch-pounds.

83. Mount the G&N Indicator Control Panel insuring that the guide pins enter the guide holes. Torque the captivated screws to 10 inch-pounds.

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

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INITIAL TDRR 05368 **D.S PGS** ___

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION Assembly of Guidance Components into a complete G & N System Test Configuration and preparation of GSE and G & N System for acceptance testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	7-7-64	10841			WK	IB
B	10-2-64	13321	all	—	wk	WGR

REFERENCES

IMPORTANT: See below.

INTERVAL

TOOLS AND MATERIAL: See below.

TOOLS AND MATERIAL: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended may be substituted.

Item No.	Number Req'd	Description
1	1 Set	A set of torque wrenches with a range of 1-250 inch pounds with adapters.
2	1	IMU and Optics Navigation Base Ass'y. Sling and Handling Fixture.
3	1	PSA End Connector and Cable Harness Handling Fixture.
4	1	G & N System Equipment #1014999 Dwg.

IMPORTANT: The G & N System must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G & N system and components. Performance of this JDC requires 3 men during steps B.3 through B.52.

A. SAFETY REQUIREMENTS

1. All circuit breakers supplying OIA power to G & N equipment shall be in the OFF position.

2. All signal carrying circuits beginning, terminating, or going thru the G & N

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

JDC 10005 **REV** B **PAGE** 2 **OF** 10

SUBSYSTEM G & N SYSTEM

ASSY

equipment shall be de-energized, except for IMU auxiliary temperature control.

3. All tools shall be in proper operating condition.

4. A thorough visual examination of all equipment shall be performed to detect possible physical damage and to check for sharp edges and abrasion points which could be hazardous to personnel installing G & N equipment as well as to cable bundles, harnesses and connectors.

B. PROCEDURES

NOTE: All directions given are for a technician facing south in front of the G & N Mounting Fixture.

GSE-GSE Connections

1. Place Prime Power Circuit Breaker located on the back of the OIA console to OFF.

2. Insure that the following cables are connected. Insure that no other cables between the GSE J-Box and the GSE consoles are connected.

Cable No.	Drawing No.	From	To
W1	1900886	OIA J1	OSC CON J1
W2	1900669	OIA J2	OSC CON J2
W3	1900670	OIA J3	OSC CON J3
W4	1900671	OIA J4	OSC CON J4
W19	1900873	OIA J20	Coolant & Pwr CON J3
W22	1900959	OIA J23	CTS J5
W26	1900921	OIA A30J1	Wall Power
W27	1900871	OIA A30J2	Coolant & Pwr CON J1
W28	1900872	Coolant & Pwr CON J2	Wall Power
W29	1900879	Coolant & Pwr CON J4	GSE J-Box J6
PWR	—	CTS J1	Wall Power
W25	1900918	OIA J26	GSE J-Box Emergency Power Cable

Connect all ground cables as shown in figure 1 for a G & N Universal Test Station configuration or connect all ground cables as shown in figure 2 for a G & N Test Station configuration.

DATE ______

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

JDC 10005 **REV** B **PAGE** 3 **OF** 10

SUBSYSTEM G & N SYSTEM

ASSY

Installation of PSA End Connector and Cable Harness

3. Remove structural support panels from the G & N Mounting Fixture and retain hardware for use in step B.57 and B.60. Set G & N Mounting Fixture Cradle to approximately horizontal or 90° position.

4. Remove all screws holding the End Connector to the PSA End Connector and Cable Harness Handling Fixture (1901846).

5. Pick up the PSA End Connector and Cable Harness Handling Fixture and place it as far back as possible in the G & N Mounting Fixture.

6. Release the clamps holding the CDU wire trunk and the DSKY wire trunk.

7. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G & N Mounting Fixture as the PSA End Connector and Harness Trunk Handling Fixture is moved forward. When the End Connector is in its approximate position, set the PSA End Connector and Cable Harness Handling Fixture down.

8. Release all other clamps holding harness trunks.

9. With two men supporting harness trunks and the End Connector, remove the PSA End Connector and Cable Harness Handling Fixture.

10. Place PSA End Connector over mounting holes in G & N Mounting Fixture Cradle.

11. Install two 10-32, 1-3/8 inch socket head guide screws (1901594) and two flat washers (AN960C10) through the bottom of the G & N Mounting Fixture Cradle into the PSA End Connector guide screw receptacles. Install four 10-32, 1-3/8 inch socket head screws (MS16996-16) and 4 flat washers (AN960C10) in remaining holes to secure the PSA End Connector in the G & N Mounting Fixture Cradle. Torque screws to 20-25 inch-pounds.

12. Secure left D&C Harness Trunk (upper trunk) to left side of G & N Mounting Fixture Cradle torquing clamp bolts down snug.

Installation of Optics Navigation Base

13. Insure that the IMU mounting surfaces on the Navigation Base are clean and free of burrs after removing protective pads.

14. Install the Optics Navigation Base Handling Fixture (1901426) to the Navigation Base.

15. Install four eye bolts in the Optics Navigation Base Handling Fixture.

16. Attach the sling to the monorail hoist.

17. Attach the sling to the four eye bolts on the Optics Navigation Base Handling Fixture.

18. Raise the Optics Navigation Base Assembly from its container.

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

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SUBSYSTEM G & N SYSTEM

ASSY

19. Adjust the sling so that the Optics Navigation Base Assembly is approximately horizontal.

20. Remove the two upper and one lower pad and ball mount assemblies from the G & N Mounting Fixture.

21. Carefully examine the mating surfaces of the Optics Navigation Base and the ball mount assemblies to insure that they are clean and free of burrs.

22. Attach the ball mount assemblies to the Optics Navigation Base Assembly as illustrated. Tighten the six ball mount bolts finger tight.

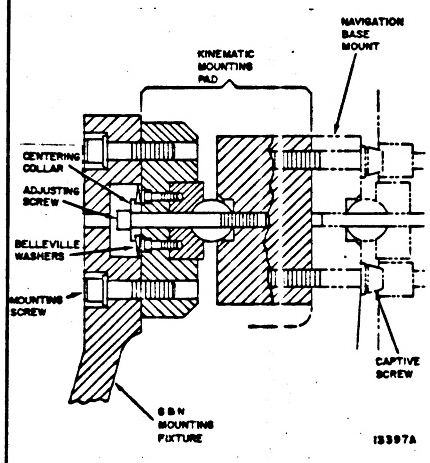
NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

23. Taking care to center the Belleville washers, torque the 3 adjusting screws for preloading the kinematic mount balls to 5-7 inch-pounds.

24. Carefully examine the mating surfaces of the mounting pads and the G & N Mounting Fixture frame to insure that they are clean and free from burrs.

25. Slowly and carefully move the Optics Navigation Base Assembly to the correct position over the G & N Mounting Fixture.

26. Lower the assembly slowly and carefully to its mating position over the G & N Mounting Fixture taking care to avoid interference with the PSA End Connector and Cable Harness.



Installation of Mounting Pads
(Cross-Sectional View)

27. When the locating pin holes of the 3 kinematic mount pads are lined up with the corresponding pins on the G & N Mounting Fixture complete the lowering of the assembly.

28. Install all six kinematic mount pad bolts finger tight.

29. Torque all 12 bolts, 6 for the 3 ball mounts and 6 for the pads, to 90-100 inch-pounds. Tighten the 3 adjusting screws for preloading the kinematic mount balls until centering collar bottoms. Loosen adjusting screws 1/8 turn.

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING	**JDC** 10005 **REV.** B **PAGE** 1 **OF** 10 **INITIAL TDRR** 05368 **D.S. PGS**
SUBSYSTEM G & N SYSTEM	**ASSY.**

DESCRIPTION Assembly of Guidance Components into a complete G & N System Test Configuration and preparation of GSE and G & N System for acceptance testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	7-7-64	10841			WK	JB
B	10-2-64	13121	all	—	wk	WJR

REFERENCES

IMPORTANT: See below.

INTERVAL

TOOLS AND MATERIAL: See below.

TOOLS AND MATERIAL: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended may be substituted.

Item No.	Number Req'd	Description
1	1 Set	A set of torque wrenches with a range of 1-250 inch pounds with adapters.
2	1	IMU and Optics Navigation Base Ass'y. Sling and Handling Fixture.
3	1	PSA End Connector and Cable Harness Handling Fixture.
4	1	G & N System Equipment #1014999 Dwg.

IMPORTANT: The G & N System must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G & N system and components. Performance of this JDC requires 3 men during steps B.3 through B.52.

A. SAFETY REQUIREMENTS

1. All circuit breakers supplying OIA power to G & N equipment shall be in the OFF position.

2. All signal carrying circuits beginning, terminating, or going thru the G & N

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING	**JDC** 10005 **REV** B **PAGE** 2 **OF** 10
SUBSYSTEM G & N SYSTEM	**ASSY**

equipment shall be de-energized, except for IMU auxiliary temperature control.

3. All tools shall be in proper operating condition.

4. A thorough visual examination of all equipment shall be performed to detect possible physical damage and to check for sharp edges and abrasion points which could be hazardous to personnel installing G & N equipment as well as to cable bundles, harnesses and connectors.

B. PROCEDURES

NOTE: All directions given are for a technician facing south in front of the G & N Mounting Fixture.

GSE-GSE Connections

1. Place Prime Power Circuit Breaker located on the back of the OIA console to OFF.

2. Insure that the following cables are connected. Insure that no other cables between the GSE J-Box and the GSE consoles are connected.

Cable No.	Drawing No.	From	To
W1	1900886	OIA J1	OSC CON J1
W2	1900669	OIA J2	OSC CON J2
W3	1900670	OIA J3	OSC CON J3
W4	1900671	OIA J4	OSC CON J4
W19	1900873	OIA J20	Coolant & Pwr CON J3
W22	1900959	OIA J23	CTS J5
W26	1900921	OIA A30J1	Wall Power
W27	1900871	OIA A30J2	Coolant & Pwr CON J1
W28	1900872	Coolant & Pwr CON J2	Wall Power
W29	1900879	Coolant & Pwr CON J4	GSE J-Box J6
PWR	--	CTS J1	Wall Power
W25	1900918	OIA J26	GSE J-Box Emergency Power Cable

Connect all ground cables as shown in figure 1 for a G & N Universal Test Station configuration or connect all ground cables as shown in figure 2 for a G & N Test Station configuration.

DATE ______

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING	**JDC** 10005 **REV** B **PAGE** 3 **OF** 10
SUBSYSTEM G & N SYSTEM	**ASSY**

Installation of PSA End Connector and Cable Harness

3. Remove structural support panels from the G & N Mounting Fixture and retain hardware for use in step B.57 and B.60. Set G & N Mounting Fixture Cradle to approximately horizontal or 90° position.

4. Remove all screws holding the End Connector to the PSA End Connector and Cable Harness Handling Fixture (1901846).

5. Pick up the PSA End Connector and Cable Harness Handling Fixture and place it as far back as possible in the G & N Mounting Fixture.

6. Release the clamps holding the CDU wire trunk and the DSKY wire trunk.

7. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G & N Mounting Fixture as the PSA End Connector and Harness Trunk Handling Fixture is moved forward. When the End Connector is in its approximate position, set the PSA End Connector and Cable Harness Handling Fixture down.

8. Release all other clamps holding harness trunks.

9. With two men supporting harness trunks and the End Connector, remove the PSA End Connector and Cable Harness Handling Fixture.

10. Place PSA End Connector over mounting holes in G & N Mounting Fixture Cradle.

11. Install two 10-32, 1-3/8 inch socket head guide screws (1901594) and two flat washers (AN960C10) through the bottom of the G & N Mounting Fixture Cradle into the PSA End Connector guide screw receptacles. Install four 10-32, 1-3/8 inch socket head screws (MS16996-16) and 4 flat washers (AN960C10) in remaining holes to secure the PSA End Connector in the G & N Mounting Fixture Cradle. Torque screws to 20-25 inch-pounds.

12. Secure left D&C Harness Trunk (upper trunk) to left side of G & N Mounting Fixture Cradle torquing clamp bolts down snug.

Installation of Optics Navigation Base

13. Insure that the IMU mounting surfaces on the Navigation Base are clean and free of burrs after removing protective pads.

14. Install the Optics Navigation Base Handling Fixture (1901426) to the Navigation Base.

15. Install four eye bolts in the Optics Navigation Base Handling Fixture.

16. Attach the sling to the monorail hoist.

17. Attach the sling to the four eye bolts on the Optics Navigation Base Handling Fixture.

18. Raise the Optics Navigation Base Assembly from its container.

DATE ______

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING	**JDC** 10005 **REV** B **PAGE** 4 **OF** 10
SUBSYSTEM G & N SYSTEM	**ASSY**

19. Adjust the sling so that the Optics Navigation Base Assembly is approximately horizontal.

20. Remove the two upper and one lower pad and ball mount assemblies from the G & N Mounting Fixture.

21. Carefully examine the mating surfaces of the Optics Navigation Base and the ball mount assemblies to insure that they are clean and free of burrs.

22. Attach the ball mount assemblies to the Optics Navigation Base Assembly as illustrated. Tighten the six ball mount bolts finger tight.

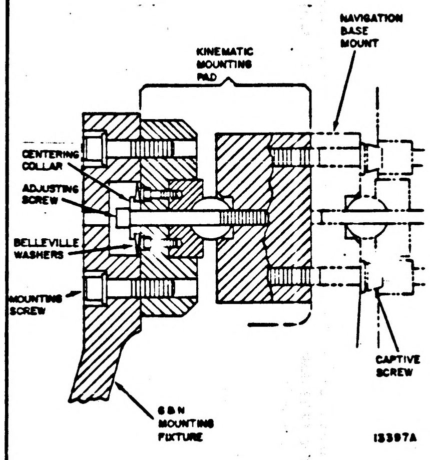
NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

23. Taking care to center the Belleville washers, torque the 3 adjusting screws for preloading the kinematic mount balls to 5-7 inch-pounds.

24. Carefully examine the mating surfaces of the mounting pads and the G & N Mounting Fixture frame to insure that they are clean and free from burrs.

25. Slowly and carefully move the Optics Navigation Base Assembly to the correct position over the G & N Mounting Fixture.

26. Lower the assembly slowly and carefully to its mating position over the G & N Mounting Fixture taking care to avoid interference with the PSA End Connector and Cable Harness.



Installation of Mounting Pads
(Cross-Sectional View)

27. When the locating pin holes of the 3 kinematic mount pads are lined up with the corresponding pins on the G & N Mounting Fixture complete the lowering of the assembly.

28. Install all six kinematic mount pad bolts finger tight.

29. Torque all 12 bolts, 6 for the 3 ball mounts and 6 for the pads, to 90-100 inch-pounds. Tighten the 3 adjusting screws for preloading the kinematic mount balls until centering collar bottoms. Loosen adjusting screws 1/8 turn.

DATE ______

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

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INITIAL TDRR 05368 **D.S. PGS**

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION Assembly of Guidance Components into a complete G & N System Test Configuration and preparation of GSE and G & N System for acceptance testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	7-7-64	10841			WK	JB
B	10-2-64	13321	all	—		

REFERENCES

IMPORTANT: See below.

INTERVAL

TOOLS AND MATERIAL: See below.

TOOLS AND MATERIAL: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended may be substituted.

Item No.	Number Req'd	Description
1	1 Set	A set of torque wrenches with a range of 1-250 inch pounds with adapters.
2	1	IMU and Optics Navigation Base Ass'y. Sling and Handling Fixture.
3	1	PSA End Connector and Cable Harness Handling Fixture.
4	1	G & N System Equipment #1014999 Dwg.

IMPORTANT: The G & N System must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G & N system and components. Performance of this JDC requires 3 men during steps B.3 through B.52.

A. SAFETY REQUIREMENTS

1. All circuit breakers supplying OIA power to G & N equipment shall be in the OFF position.

2. All signal carrying circuits beginning, terminating, or going thru the G & N

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ________

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

JDC 10005 **REV** B **PAGE** 2 **OF** 10

SUBSYSTEM G & N SYSTEM

ASSY

equipment shall be de-energized, except for IMU auxiliary temperature control.

3. All tools shall be in proper operating condition.

4. A thorough visual examination of all equipment shall be performed to detect possible physical damage and to check for sharp edges and abrasion points which could be hazardous to personnel installing G & N equipment as well as to cable bundles, harnesses and connectors.

B. PROCEDURES

NOTE: All directions given are for a technician facing south in front of the G & N Mounting Fixture.

GSE-GSE Connections

1. Place Prime Power Circuit Breaker located on the back of the OIA console to OFF.

2. Insure that the following cables are connected. Insure that no other cables between the GSE J-Box and the GSE consoles are connected.

Cable No.	Drawing No.	From	To
W1	1900686	OIA J1	OSC CON J1
W2	1900669	OIA J2	OSC CON J2
W3	1900670	OIA J3	OSC CON J3
W4	1900671	OIA J4	OSC CON J4
W19	1900873	OIA J20	Coolant & Pwr CON J3
W22	1900959	OIA J23	CTS J5
W26	1900921	OIA A30J1	Wall Power
W27	1900871	OIA A30J2	Coolant & Pwr CON J1
W28	1900872	Coolant & Pwr CON J2	Wall Power
W29	1900879	Coolant & Pwr CON J4	GSE J-Box J6
PWR	--	CTS J1	Wall Power
W25	1900918	OIA J26	GSE J-Box Emergency Power Cable

Connect all ground cables as shown in figure 1 for a G & N Universal Test Station configuration or connect all ground cables as shown in figure 2 for a G & N Test Station configuration.

DATE ________

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

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SUBSYSTEM G & N SYSTEM

ASSY

Installation of PSA End Connector and Cable Harness

3. Remove structural support panels from the G & N Mounting Fixture and retain hardware for use in step B.57 and B.60. Set G & N Mounting Fixture Cradle to approximately horizontal or 90° position.

4. Remove all screws holding the End Connector to the PSA End Connector and Cable Harness Handling Fixture (1901846).

5. Pick up the PSA End Connector and Cable Harness Handling Fixture and place it as far back as possible in the G & N Mounting Fixture.

6. Release the clamps holding the CDU wire trunk and the DSKY wire trunk.

7. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G & N Mounting Fixture as the PSA End Connector and Harness Trunk Handling Fixture is moved forward. When the End Connector is in its approximate position, set the PSA End Connector and Cable Harness Handling Fixture down.

8. Release all other clamps holding harness trunks.

9. With two men supporting harness trunks and the End Connector, remove the PSA End Connector and Cable Harness Handling Fixture.

10. Place PSA End Connector over mounting holes in G & N Mounting Fixture Cradle.

11. Install two 10-32, 1-3/8 inch socket head guide screws (1901594) and two flat washers (AN960C10) through the bottom of the G & N Mounting Fixture Cradle into the PSA End Connector guide screw receptacles. Install four 10-32, 1-3/8 inch socket head screws (MS16996-16) and 4 flat washers (AN960C10) in remaining holes to secure the PSA End Connector in the G & N Mounting Fixture Cradle. Torque screws to 20-25 inch-pounds.

12. Secure left D&C Harness Trunk (upper trunk) to left side of G & N Mounting Fixture Cradle torquing clamp bolts down snug.

Installation of Optics Navigation Base

13. Insure that the IMU mounting surfaces on the Navigation Base are clean and free of burrs after removing protective pads.

14. Install the Optics Navigation Base Handling Fixture (1901426) to the Navigation Base.

15. Install four eye bolts in the Optics Navigation Base Handling Fixture.

16. Attach the sling to the monorail hoist.

17. Attach the sling to the four eye bolts on the Optics Navigation Base Handling Fixture.

18. Raise the Optics Navigation Base Assembly from its container.

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

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SUBSYSTEM G & N SYSTEM

ASSY

19. Adjust the sling so that the Optics Navigation Base Assembly is approximately horizontal.

20. Remove the two upper and one lower pad and ball mount assemblies from the G & N Mounting Fixture.

21. Carefully examine the mating surfaces of the Optics Navigation Base and the ball mount assemblies to insure that they are clean and free of burrs.

22. Attach the ball mount assemblies to the Optics Navigation Base Assembly as illustrated. Tighten the six ball mount bolts finger tight.

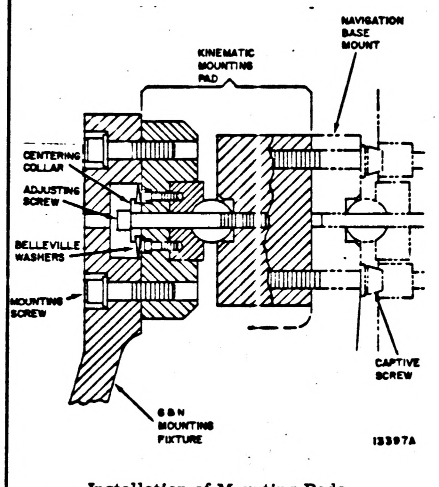
NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

23. Taking care to center the Belleville washers, torque the 3 adjusting screws for preloading the kinematic mount balls to 5-7 inch-pounds.

24. Carefully examine the mating surfaces of the mounting pads and the G & N Mounting Fixture frame to insure that they are clean and free from burrs.

25. Slowly and carefully move the Optics Navigation Base Assembly to the correct position over the G & N Mounting Fixture.

26. Lower the assembly slowly and carefully to its mating position over the G & N Mounting Fixture taking care to avoid interference with the PSA End Connector and Cable Harness.



Installation of Mounting Pads
(Cross-Sectional View)

27. When the locating pin holes of the 3 kinematic mount pads are lined up with the corresponding pins on the G & N Mounting Fixture complete the lowering of the assembly.

28. Install all six kinematic mount pad bolts finger tight.

29. Torque all 12 bolts, 6 for the 3 ball mounts and 6 for the pads, to 90-100 inch-pounds. Tighten the 3 adjusting screws for preloading the kinematic mount balls until centering collar bottoms. Loosen adjusting screws 1/8 turn.

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30. Remove the Optics Navigation Base Handling Fixture, P/N 1901426 from the Optics Navigation Base Assembly. Fasten Opitcal Shroud to G & N Mounting Fixture. Tighten the 2 screws down snug.

31. Secure left hand IMU Optics Cable Harness to the Optics Navigation Base.

32. Secure right hand IMU Optics Cable Harness to the Optics Navigation Base.

Installation of the IMU ([illegible])

33. Insure that the Portable Temperature Controller is attached to the IMU and is operating properly. See that the extension cable is coiled neatly, with no tangles so that it can be played out smoothly. Allow the IMU outer shell to cool to room temperature for 1 hour before installing in the G & N Mounting Fixture.

34. Carefully examine the Optics Navigation Base IMU mounting surfaces to insure that they are clean and free from burrs.

35. Install the four eye bolts to the IMU.

36. Attach the sling to the four eye bolts on the IMU.

37. Carefully hoist the IMU and position it above the G & N Mounting Fixture.

38. Remove protective mounting pads from IMU.

39. Transfer and lower the IMU into position so that the IMU mounting pads are approximately lined up with the Optics Navigation Base mounting pads.

40. Lower the IMU slowly insuring that the guide pins line up with the guide holes on the IMU mounting surface.

41. Lower the IMU into its final position.

42. Remove the sling and eye bolts from the IMU.

43. Torque each of the mounting bolts to 55-60 inch-pounds.

44. Set the tilt axis of the G & N Mounting Fixture to 0° (±1°).

NOTE: Loosen mounting bolts to insure that IMU is resting on alignment pins.

45. Torque the four IMU bolts to 195-200 inch-pounds in 25 inch-pound increments in the following sequence. Torque bolt in hole with locating pin first. Second torque bolt diagonally across from it. Third torque bolt in the slot. Fourth torque bolt diagonally across from it.

46. Fasten connector 56P5 on the end of the left hand cable to the Sextant connection 10J1.

47. Fasten connector 56P4 on the end of the left hand cable to the Sextant electronics package connector 10J2. Alternately, tighten each screw two turns until both are torqued down snug.

48. Fasten connector 56P8 on the end of the right hand cable to the Scanning Telescope connector 20J1.

DATE ______

49. Mate the connectors 56P2, 56P7 and 56P3 on cable to IMU connectors 35J1, 35J4 and 35J3.

(NOTE: Connector 35J2 is not mated at this time because heaters must remain attached to power thru the portable temperature controller until power can be supplied by the GSE thru Tray 7 of the PSA.)

50. Remove Snap-On Bellows from IMU.

51. Obtain Flexible Hose Assembly Optics Base to IMU P/N 1001471 and connect from IMU Coolant Exit Fitting to the Optics Coolant Fitting.

52. Connect the Flexible Hose Assembly from the IMU Coolant Supply to the inlet and exit valves of the IMU and Optics coolant circuit respectively.

Installation of PSA Trays ([illegible])

53. Obtain PSA Trays 1 thru 10 and insert in reverse sequence starting with Tray 10 using left hand to guide rear tongue into its slot and assist in mating the connectors. In turn, engage the captivated screws into toe plate inserts and torque each screw to 15-20 inch-pounds.

54. Mate connector W18-P2 with connector 45A7J2 and W18-P1 with OIA connector J19 torquing the captivated screws to 7-10 inch-pounds.

55. Connect Flexible Hose Assembly from the PSA Coolant Supply to the inlet and exit valves on the PSA cold plate.

Installation of D&C Electronics ([illegible])

56. Obtain D&C Electronics. Position it so that the mounting holes line up with the corresponding insert holes in the left hand structural support panel. Insert four screws and torque them to 15-20 inch-pounds.

57. Attach the left hand structural support panel to the G & N Mounting Fixture using hardware retained in step B.3. Tighten screws down snug.

58. Mate connector 56P1 to connector 50A3J1 on the D&C Electronics. Torque jacking screw to 5-7 inch-pounds.

Installation of Control Electronics ([illegible])

59. Obtain the Control Electronics Assembly and mount it on the right hand structural support with the four screws. Torque the screws to 15-20 inch-pounds.

60. Attach the right hand structural support panel to the G & N Mounting Fixture using hardware retained in step B.3. Tighten screws down snug.

61. Mate connector 56P10 to connector 50A4J1 on the Control Electronics Assembly. Torque the jacking screw to 5-7 inch-pounds.

Installation of G & N AGC DSKY ([illegible])

62. Install and secure AGC DSKY on upper right frame of G & N Mounting Fixture Cradle. Guide pins will insure proper positioning of DSKY. Torque eight captive bolts to 8-10 inch-pounds.

63. Hold and support 56J10 and screw AGC DSKY connector screw into 56J10 torquing the screw to 5-7 inch-pounds.

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64. Secure right D&C Harness Trunk (upper trunk) to right side of G & N Mounting Fixture Cradle torquing the clamp bolt down snug.

Installation of IMU Control Panel ([illegible])

65. Install and secure IMU Control Panel in upper left frame of G & N Mounting Fixture Cradle. Guide pins insure proper position of IMU Control Panel. Torque four captive screws to 8-10 inch-pounds.

66. Hold and support connector 56J6 and screw IMU Control Panel Connector screw into 56J6 torquing it to 5-7 inch-pounds.

67. Secure Map and Data Viewer and IMU Control Panel Trunk with its clamp at the upper left top of the G & N Mounting Fixture Cradle torquing the clamp bolt down snug.

Installation of CDU's ([illegible])

68. Install and secure CDU connectors 56J2, 56J1, 56J3, 56J4 and 56J5 in the listed order to the CDU Mounting Frame using special studs P/N 1016889 and flex lock nuts P/N AN365D-440 torqued to 5-7 inch-pounds.

69. Secure upper clamp to the J5, J4 harness and the lower clamp to the J3, J2, J1 harness torquing the clamp bolts down snug.

70. Obtain the five CDU Assemblies and insert them into place in sequence starting with the top and working down. Insert the tongue in the slot at the rear and then engage and torque the captivated jacking screws to 35-40 inch-pounds.

71. Obtain the CDU cover panel and fasten it in place over the CDU module boxes torquing the 4 captivated screws to 7-10 inch-pounds.

Installation of the Map and Data Viewer ([illegible])

72. Obtain the Map and Data Viewer and place it on the G & N Mounting Fixture insuring that the two guide pins enter the guide holes. Torque all four screws to 7-10 inch-pounds.

73. Mate connector 56J8 to connector P1. Open up the cartridge door and engage torque wrench in the socket head cap screw in the center of the connector. Torque the jacking screw to 5-7 inch-pounds.

74. Mount signal conditioning cable connector 56P9 to its bracket on the inside right hand wall of the G & N Mounting Fixture. Torque all screws to 7-10 inch-pounds.

75. Connect cable W32 to connector 56P9. Torquing jacking screw to 5-7 inch-pounds. Do not connect the other end of cable W32 to OIA connectors J6, J7 and J12 at this time.

Installation of AGC ([illegible])

76. Remove trays A, B, and C from the AGC frame.

77. Pick up the AGC frame by its handling fixture and slide it into the G & N Mounting

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Fixture. Torque the holding screws to 40-50 inch-pounds.

78. Tilt the G & N Mounting Fixture to approximately-45° so that the access cover on right rear side of the AGC Handling Fixture is accessable. Remove access cover.

79. Insert Logic Tray C and torque jacking screw to 15-20 inch pounds. Mate connector 05A3P1 to connector 56J21 and connector 05A3P2 to 56J22. Torque the jacking screws to 5-7 inch-pounds. Replace access cover.

80. Insert Logic Tray A and Memory Tray B and torque jacking screws to 15-20 inch-pounds. Tilt G & N Mounting Fixture to approximately 0°.

81. Connect the Flexible Hose Ass'y from the AGC coolant supply to the inlet and exit valves of the AGC cold plate.

Installation of Main Panel DSKY ([illegible])

82. Install the Main Panel DSKY Stand in its place.

83. Mount the Main Panel DSKY on the stand torquing all screws to 7-10 inch-pounds.

Power Turn On of OIA

84. Place the Prime Power Circuit Breakers on the back of the OIA Coolant Supply and Oscillograph Consoles to ON.

85. Set ICTC POWER SWITCH on BATTERY POWER PACK (1900011-011) to OFF, if present in the configuration.

86. Set PTC Power Switch to OFF.

87. Remove PTC Power Cable connector P2 from connector J2 on the IMU.

88. Connect G & N System Harness cable connector 56P6 to connector J2 on the IMU.

89. Apply power to the TEMPERATURE MONITOR CONTROL panel by pressing the 115V 60 cps CONTROL SWITCH.

90. Set the ALARM DISABLE switch on the back of the MONITOR PANEL to ALARM ENABLE.

91. Set the MONITOR METER SELECT switch to AUX HTR CURRENT and observe presence of heater current as indicated on the MONITOR METER.

92. Set the MONITOR METER SELECT switch to AUX IRIG and observe that the indicated temperature on the MONITOR METER is within the range of -5 to +5° F.

Installation of the G & N Indicator-Control Panel (1[illegible]-011)

93. Position the G & N Indicator Control Panel near its mounting surface on the G & N Mounting Fixture. Reach underneath and mate connector 56J9 to connector 50A1P1. Torque jacking screw on the front of the G & N Indicator Panel to 5-7 inch-pounds.

94. Mount the G & N Indicator Control Panel insuring that the guide pins enter the guide holes. Torque the captivated screws to 7-10 inch-pounds.

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING
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INITIAL TDRR 05368 D.S. PGS

SUBSYSTEM G & N SYSTEM
ASSY.

DESCRIPTION Assembly of Guidance Components into a complete G & N System Test Configuration and preparation of GSE and G & N System for acceptance testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	7-7-64	10841			WK	JB
B	10-2-64	13331	all	—	wk	WJR

REFERENCES

IMPORTANT: See below.

INTERVAL

TOOLS AND MATERIAL: See below.

TOOLS AND MATERIAL: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended may be substituted.

Item No.	Number Req'd	Description
1	1 Set	A set of torque wrenches with a range of 1-250 inch pounds with adapters.
2	1	IMU and Optics Navigation Base Ass'y. Sling and Handling Fixture.
3	1	PSA End Connector and Cable Harness Handling Fixture.
4	1	G & N System Equipment #1014999 Dwg.

IMPORTANT: The G & N System must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G & N system and components. Performance of this JDC requires 3 men during steps B.3 through B.52.

A. SAFETY REQUIREMENTS

1. All circuit breakers supplying OIA power to G & N equipment shall be in the OFF position.

2. All signal carrying circuits beginning, terminating, or going thru the G & N

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING
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equipment shall be de-energized, except for IMU auxiliary temperature control.

3. All tools shall be in proper operating condition.

4. A thorough visual examination of all equipment shall be performed to detect possible physical damage and to check for sharp edges and abrasion points which could be hazardous to personnel installing G & N equipment as well as to cable bundles, harnesses and connectors.

B. PROCEDURES

NOTE: All directions given are for a technician facing south in front of the G & N Mounting Fixture.

GSE-GSE Connections

1. Place Prime Power Circuit Breaker located on the back of the OIA console to OFF.

2. Insure that the following cables are connected. Insure that no other cables between the GSE J-Box and the GSE consoles are connected.

Cable No.	Drawing No.	From	To
W1	1900886	OIA J1	OSC CON J1
W2	1900669	OIA J2	OSC CON J2
W3	1900670	OIA J3	OSC CON J3
W4	1900671	OIA J4	OSC CON J4
W19	1900873	OIA J20	Coolant & Pwr CON J3
W22	1900959	OIA J23	CTS J5
W26	1900921	OIA A30J1	Wall Power
W27	1900871	OIA A30J2	Coolant & Pwr CON J1
W28	1900872	Coolant & Pwr CON J2	Wall Power
W29	1900879	Coolant & Pwr CON J4	GSE J-Box J6
PWR	—	CTS J1	Wall Power
W25	1900918	OIA J26	GSE J-Box Emergency Power Cable

Connect all ground cables as shown in figure 1 for a G & N Universal Test Station configuration or connect all ground cables as shown in figure 2 for a G & N Test Station configuration.

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING
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SUBSYSTEM G & N SYSTEM
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Installation of PSA End Connector and Cable Harness

3. Remove structural support panels from the G & N Mounting Fixture and retain hardware for use in step B.57 and B.60. Set G & N Mounting Fixture Cradle to approximately horizontal or 90° position.

4. Remove all screws holding the End Connector to the PSA End Connector and Cable Harness Handling Fixture (1901846).

5. Pick up the PSA End Connector and Cable Harness Handling Fixture and place it as far back as possible in the G & N Mounting Fixture.

6. Release the clamps holding the CDU wire trunk and the DSKY wire trunk.

7. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G & N Mounting Fixture as the PSA End Connector and Harness Trunk Handling Fixture is moved forward. When the End Connector is in its approximate position, set the PSA End Connector and Cable Harness Handling Fixture down.

8. Release all other clamps holding harness trunks.

9. With two men supporting harness trunks and the End Connector, remove the PSA End Connector and Cable Harness Handling Fixture.

10. Place PSA End Connector over mounting holes in G & N Mounting Fixture Cradle.

11. Install two 10-32, 1-3/8 inch socket head guide screws (1901594) and two flat washers (AN960C10) through the bottom of the G & N Mounting Fixture Cradle into the PSA End Connector guide screw receptacles. Install four 10-32, 1-3/8 inch socket head screws (MS16996-16) and 4 flat washers (AN960C10) in remaining holes to secure the PSA End Connector in the G & N Mounting Fixture Cradle. Torque screws to 20-25 inch-pounds.

12. Secure left D&C Harness Trunk (upper trunk) to left side of G & N Mounting Fixture Cradle torquing clamp bolts down snug.

Installation of Optics Navigation Base

13. Insure that the IMU mounting surfaces on the Navigation Base are clean and free of burrs after removing protective pads.

14. Install the Optics Navigation Base Handling Fixture (1901426) to the Navigation Base.

15. Install four eye bolts in the Optics Navigation Base Handling Fixture.

16. Attach the sling to the monorail hoist.

17. Attach the sling to the four eye bolts on the Optics Navigation Base Handling Fixture.

18. Raise the Optics Navigation Base Assembly from its container.

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING
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SUBSYSTEM G & N SYSTEM
ASSY

19. Adjust the sling so that the Optics Navigation Base Assembly is approximately horizontal.

20. Remove the two upper and one lower pad and ball mount assemblies from the G & N Mounting Fixture.

21. Carefully examine the mating surfaces of the Optics Navigation Base and the ball mount assemblies to insure that they are clean and free of burrs.

22. Attach the ball mount assemblies to the Optics Navigation Base Assembly as illustrated. Tighten the six ball mount bolts finger tight.

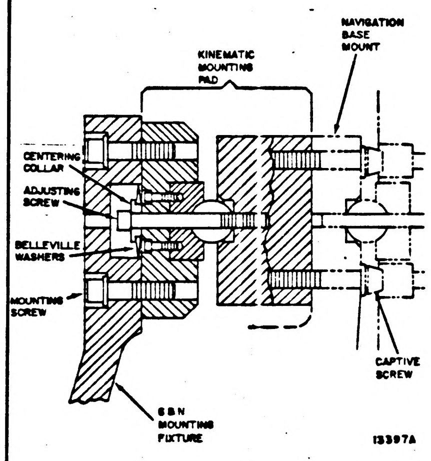
NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

23. Taking care to center the Belleville washers, torque the 3 adjusting screws for preloading the kinematic mount balls to 5-7 inch-pounds.

24. Carefully examine the mating surfaces of the mounting pads and the G & N Mounting Fixture frame to insure that they are clean and free from burrs.

25. Slowly and carefully move the Optics Navigation Base Assembly to the correct position over the G & N Mounting Fixture.

26. Lower the assembly slowly and carefully to its mating position over the G & N Mounting Fixture taking care to avoid interference with the PSA End Connector and Cable Harness.



Installation of Mounting Pads (Cross-Sectional View)

27. When the locating pin holes of the 3 kinematic mount pads are lined up with the corresponding pins on the G & N Mounting Fixture complete the lowering of the assembly.

28. Install all six kinematic mount pad bolts finger tight.

29. Torque all 12 bolts, 6 for the 3 ball mounts and 6 for the pads, to 90-100 inch-pounds. Tighten the 3 adjusting screws for preloading the kinematic mount balls until centering collar bottoms. Loosen adjusting screws 1/8 turn.

DATE ________

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING | **JDC** 10005 **REV** B **PAGE** 9 **OF** 10

SUBSYSTEM G & N SYSTEM | **ASSY**

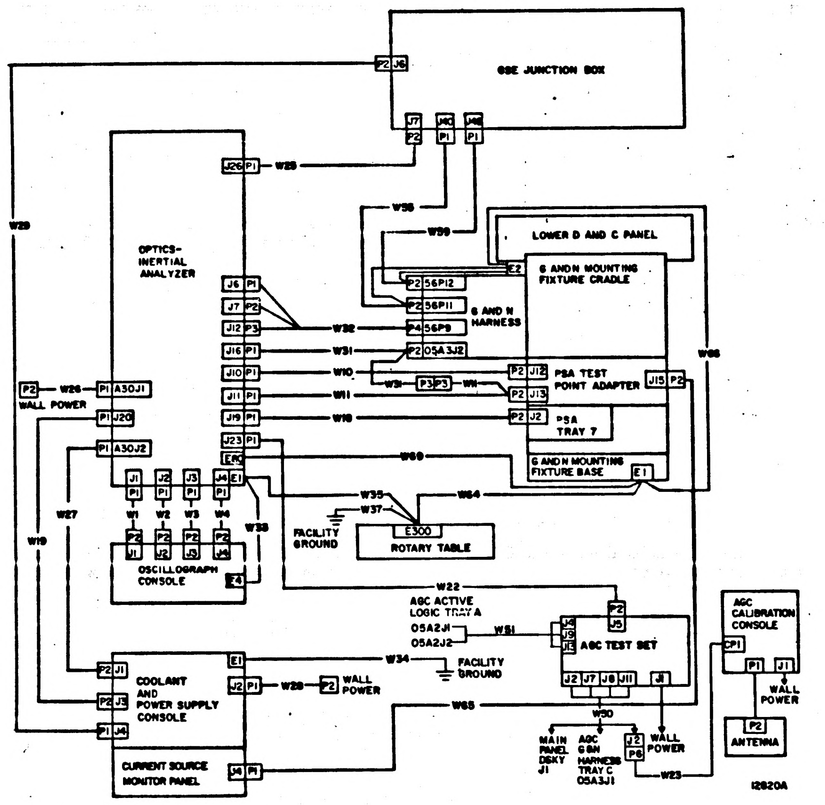
GSE JUNCTION BOX
P2 J6
J7 P2
J40 P1
J46 P1
J26 P1
W25
W29
W56
W59
LOWER D AND C PANEL
OPTICS-INERTIAL ANALYZER
E2
G AND N MOUNTING FIXTURE CRADLE
J6 P1
J7 P2
J12 P3
W32
P2 56P12
P2 56P11
P4 56P9
G AND N HARNESS
J16 P1
W31
P2 05A3J2
W66
J10 P1
W10
P2 J12
PSA TEST POINT ADAPTER
J15 P2
P2
W26
P1 A30J1
WALL POWER
W31
P3 P3
W11
P2 J13
J11 P1
W11
P1 J20
J19 P1
W18
P2 J2
PSA TRAY 7
J23 P1
P1 A30J2
E80
W69
G AND N MOUNTING FIXTURE BASE
E1
J1 P1
J2 P1
J3 P1
J4 P1
E1
W35
W64
W27
W1
W2
W3
W4
W37
W19
W38
FACILITY GROUND
E300
ROTARY TABLE
P2 J1
P2 J2
P2 J3
P2 J4
OSCILLOGRAPH CONSOLE
E4
W22
AGC ACTIVE LOGIC TRAY A
P2
J5
AGC CALIBRATION CONSOLE
05A2J1
05A2J2
W51
J4
J9
J13
AGC TEST SET
CP1
E1
W34
FACILITY GROUND
P2 J1
COOLANT AND POWER SUPPLY CONSOLE
J2 P1
W28
P2
WALL POWER
J2 J7 J8 J11
J1
P1
J1
WALL POWER
P2 J3
W65
W50
P1 J4
P2
ANTENNA
MAIN PANEL DSKY J1
AGC G&N HARNESS TRAY C 05A3J1
J2
P6
WALL POWER
CURRENT SOURCE MONITOR PANEL
J4 P1
W23
12820A

Figure 1. G & N Universal Test Station Cabling Diagram

DATE ________

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING | **JDC** 10005 **REV** B **PAGE** 10 **OF** 10

SUBSYSTEM G & N SYSTEM | **ASSY**

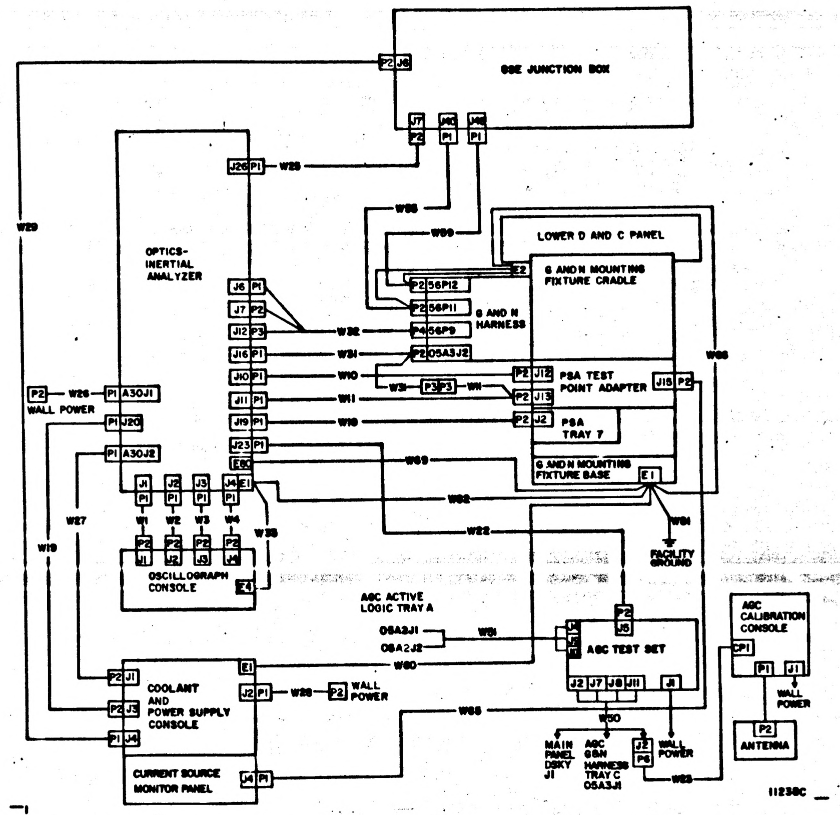
GSE JUNCTION BOX
P2 J6
J7 P2
J40 P1
J46 P1
J26 P1
W25
W29
W56
W59
LOWER D AND C PANEL
OPTICS-INERTIAL ANALYZER
E2
G AND N MOUNTING FIXTURE CRADLE
J6 P1
J7 P2
J12 P3
W32
P2 56P12
P2 56P11
P4 56P9
G AND N HARNESS
J16 P1
W31
P2 05A3J2
W66
J10 P1
W10
P2 J12
PSA TEST POINT ADAPTER
J15 P2
P2
W26
P1 A30J1
WALL POWER
W31
P3 P3
W11
P2 J13
J11 P1
W11
P1 J20
J19 P1
W18
P2 J2
PSA TRAY 7
J23 P1
P1 A30J2
E80
W69
G AND N MOUNTING FIXTURE BASE
E1
J1 P1
J2 P1
J3 P1
J4 P1
E1
W62
W27
W1
W2
W3
W4
W61
W22
W19
W38
FACILITY GROUND
P2 J1
P2 J2
P2 J3
P2 J4
OSCILLOGRAPH CONSOLE
E4
AGC ACTIVE LOGIC TRAY A
P2
J5
AGC CALIBRATION CONSOLE
05A2J1
05A2J2
W51
J4
J9
J13
AGC TEST SET
CP1
E1
W60
P2 J1
COOLANT AND POWER SUPPLY CONSOLE
J2 P1
W28
P2
WALL POWER
J2 J7 J8 J11
J1
P1
J1
WALL POWER
P2 J3
W65
W50
P1 J4
P2
ANTENNA
MAIN PANEL DSKY J1
AGC G&N HARNESS TRAY C 05A3J1
J2
P6
WALL POWER
CURRENT SOURCE MONITOR PANEL
J4 P1
W23
11238C

Figure 2. G & N System Test Station Cabling Diagram

DATE ________

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PHOTOGRAPHIC SCALE ONLY

Released with ATP 1015500

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

JDC 10005 **REV.** C **PAGE** 1 **OF** 10

INITIAL TDRR 05368 **D.S. PGS** —

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION Assembly of Guidance Components into a complete G & N System Test Configuration and preparation of GSE and G & N System for acceptance testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	7-7-64	10841			WK	JB
B	10-2-64	13131	all	—	[illegible]	[illegible]
C	12/22/64	15019	2, 3, 5-8	N.P	W.K.	W.J.B.

REFERENCES

IMPORTANT: See below.

INTERVAL

TOOLS AND MATERIAL: See below.

TOOLS AND MATERIAL: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended may be substituted.

Item No.	Number Req'd	Description
1	1 Set	A set of torque wrenches with a range of 1-250 inch pounds with adapters.
2	1	IMU and Optics Navigation Base Ass'y. Sling and Handling Fixture.
3	1	PSA End Connector and Cable Harness Handling Fixture.
4	1	G & N System Equipment #1014999 Dwg.

IMPORTANT: The G & N System must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G & N system and components. Performance of this JDC requires 3 men during steps B.3 through B.52.

A. SAFETY REQUIREMENTS

1. All circuit breakers supplying OIA power to G & N equipment shall be in the OFF position.

2. All signal carrying circuits beginning, terminating, or going thru the G & N

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

JDC 10005 **REV** C **PAGE** 2 **OF** 10

SUBSYSTEM G & N SYSTEM

ASSY

equipment shall be de-energized, except for IMU auxiliary temperature control.

3. All tools shall be in proper operating condition.

4. A thorough visual examination of all equipment shall be performed to detect possible physical damage and to check for sharp edges and abrasion points which could be hazardous to personnel installing G & N equipment as well as to cable bundles, harnesses and connectors.

B. PROCEDURES

NOTE: All directions given are for a technician facing south in front of the G & N Mounting Fixture.

NOTE: Insure that the IMU has been purged and filled. If not, refer to JDC 18045 for procedures.

GSE-GSE Connections

1. Place Prime Power Circuit Breaker located on the back of the OIA console to OFF.

2. Insure that the following cables are connected. Insure that no other cables between the GSE J-Box and the GSE consoles are connected.

Cable No.	Drawing No.	From	To
W1	1900886	OIA J1	OSC CON J1
W2	1900669	OIA J2	OSC CON J2
W3	1900670	OIA J3	OSC CON J3
W4	1900671	OIA J4	OSC CON J4
W19	1900873	OIA J20	Coolant & Pwr CON J3
W22	1900959	OIA J23	CTS J5
W26	1900921	OIA A30J1	Wall Power
W27	1900871	OIA A30J2	Coolant & Pwr CON J1
W28	1900872	Coolant & Pwr CON J2	Wall Power
W29	1900879	Coolant & Pwr CON J4	GSE J-Box J6
PWR	--	CTS J1	Wall Power
W25	1900918	OIA J26	GSE J-Box Emergency Power Cable

Connect all ground cables as shown in figure 1 for a G & N Universal Test Station configuration or connect all ground cables as shown in figure 2 for a G & N Test Station configuration.

DATE ______

JOB: ASSEMBLY AND PREPARATION OF G&N SYSTEM FOR TESTING

JDC: 10005 **REV:** C **PAGE** 3 **OF** 10

SUBSYSTEM: G & N SYSTEM

ASSY:

Installation of PSA End Connector and Cable Harness

3. Remove structural support panels from the G&N Mounting Fixture and retain hardware for use in step B.57 and B.60. Set G & N Mounting Fixture Cradle to approximately horizontal or 90° position.

4. Remove all screws holding the End Connector to the PSA End Connector and Cable Harness Handling Fixture (1901846).

5. Pick up the PSA End Connector and Cable Harness Handling Fixture and place it as far back as possible in the G & N Mounting Fixture.

6. Release the clamps holding the CDU wire trunk and the DSKY wire trunk.

7. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G & N Mounting Fixture as the PSA End Connector and Harness Trunk Handling Fixture is moved forward. When the End Connector is in its approximate position, set the PSA End Connector and Cable Harness Handling Fixture down.

8. Release all other clamps holding harness trunks.

9. With two men supporting harness trunks and the End Connector, remove the PSA End Connector and Cable Harness Handling Fixture.

10. Place PSA End Connector over mounting holes in G & N Mounting Fixture Cradle.

NOTE: If the alignment of the PSA Coldplate and the G & N Mounting Fixture cradle has been disturbed it is necessary to insert the 2 outside screws (in the row of 4) through the bottom of the G & N Mounting Fixture into the PSA End Connector guide screw receptacles first. The remaining 4 screws are then inserted.

11. Install six 10-32, 1-1/2 in socket head screws (MS16996-16) and 6 flat washers (AN960C10) to secure the PSA End Connector in the G & N Mounting Fixture Cradle. Torque screws to 20-25 in-pounds.

12. Secure left D&C Harness Trunk (upper trunk) to left side of G & N Mounting Fixture Cradle torquing clamp bolts down snug.

Installation of Optics Navigation Base

13. Insure that the IMU mounting surfaces on the Navigation Base are clean and free of burrs after removing protective pads.

14. Install the Optics Navigation Base Handling Fixture (1901426) to the Navigation Base.

15. Install four eye bolts in the Optics Navigation Base Handling Fixture.

16. Attach the sling to the monorail hoist.

17. Attach the sling to the four eye bolts on the Optics Navigation Base Handling Fixture.

18. Raise the Optics Navigation Base Assembly from its container.

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

JDC 10005 **REV** C **PAGE** 4 **OF** 10

SUBSYSTEM G & N SYSTEM

ASSY

19. Adjust the sling so that the Optics Navigation Base Assembly is approximately horizontal.

20. Remove the two upper and one lower pad and ball mount assemblies from the G & N Mounting Fixture.

21. Carefully examine the mating surfaces of the Optics Navigation Base and the ball mount assemblies to insure that they are clean and free of burrs.

22. Attach the ball mount assemblies to the Optics Navigation Base Assembly as illustrated. Tighten the six ball mount bolts finger tight.

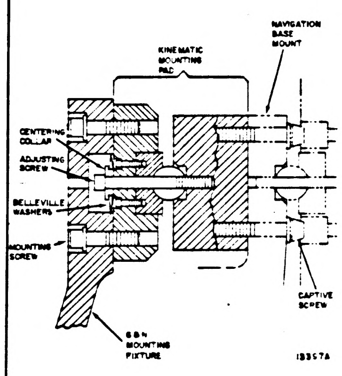
NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

23. Taking care to center the Belleville washers, torque the 3 adjusting screws for preloading the kinematic mount balls to 5-7 inch-pounds.

24. Carefully examine the mating surfaces of the mounting pads and the G & N Mounting Fixture frame to insure that they are clean and free from burrs.

25. Slowly and carefully move the Optics Navigation Base Assembly to the correct position over the G & N Mounting Fixture.

26. Lower the assembly slowly and carefully to its mating position over the G & N Mounting Fixture taking care to avoid interference with the PSA End Connector and Cable Harness.



Installation of Mounting Pads
(Cross-Sectional View)

27. When the locating pin holes of the 3 kinematic mount pads are lined up with the corresponding pins on the G & N Mounting Fixture complete the lowering of the assembly.

28. Install all six kinematic mount pad bolts finger tight.

29. Torque all 12 bolts, 6 for the 3 ball mounts and 6 for the pads, to 90-100 inch-pounds. Tighten the 3 adjusting screws for preloading the kinematic mount balls until centering collar bottoms. Loosen adjusting screws 1/8 turn.

DATE ______

30. Remove the Optics Navigation Base Handling Fixture, P/N 1901426 from the Optics Navigation Base Assembly. Fasten Guard and Seal Ass'y to G & N Mounting Fixture. Tighten the 2 screws down snug.

31. Secure left hand IMU Optics Cable Harness to the Optics Navigation Base.

32. Secure right hand IMU Optics Cable Harness to the Optics Navigation Base.

Installation of the IMU

33. Insure that the Portable Temperature Controller is attached to the IMU and is operating properly. See that the extension cable is coiled neatly, with no tangles so that it can be played out smoothly. Allow the IMU outer shell to cool to room temperature for 1 hour before installing in the G & N Mounting Fixture.

34. Carefully examine the Optics Navigation Base IMU mounting surfaces to insure that they are clean and free from burrs.

35. Install the four eye bolts to the IMU.

36. Attach the sling to the four eye bolts on the IMU.

37. Carefully hoist the IMU and position it above the G & N Mounting Fixture.

38. Remove protective mounting pads from IMU.

39. Transfer and lower the IMU into position so that the IMU mounting pads are approximately lined up with the Optics Navigation Base mounting pads.

40. Lower the IMU slowly insuring that the guide pins line up with the guide holes on the IMU mounting surface.

41. Lower the IMU into its final position.

42. Remove the sling and eye bolts from the IMU.

43. Torque each of the mounting bolts to 55-60 inch-pounds.

44. Set the tilt axis of the G & N Mounting Fixture to 0° (±1°).

NOTE: Loosen mounting bolts to insure that IMU is resting on alignment pins.

45. Torque the four IMU bolts to 195-200 inch-pounds in 25 inch-pound increments in the following sequence. Torque bolt in hole with locating pin first. Second torque bolt diagonally across from it. Third torque bolt in the slot. Fourth torque bolt diagonally across from it.

46. Fasten connector 56P5 on the end of the left hand cable to the Sextant connection 10J1.

47. Fasten connector 56P4 on the end of the left hand cable to the Sextant electronics package connector 10J2. Alternately, tighten each screw two turns until both are torqued down snug.

48. Fasten connector 56P8 on the end of the right hand cable to the Scanning Telescope connector 20J1.

DATE ________

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49. Mate the connectors 56P2, 56P7 and 56P3 on cable to IMU connectors 35J1, 35J4 and 35J3.

(NOTE: Connector 35J2 is not mated at this time because heaters must remain attached to power thru the portable temperature controller until power can be supplied by the GSE thru Tray 7 of the PSA.)

50. Remove Snap-On Bellows from IMU.

51. Connect flexible hose assy from IMU coolant supply outlet to inlet valve of IMU.

52. Connect flexible hose assy from IMU outlet valve to IMU coolant supply inlet.

Installation of PSA Trays

53. Obtain PSA Trays 1 thru 10 and insert in reverse sequence starting with Tray 10 using left hand to guide rear tongue into its slot and assist in mating the connectors. In turn, engage the captivated screws into toe plate inserts and torque each screw to 15-20 inch-pounds.

54. Mate connector W18-P2 with connector 45A7J2 and W18-P1 with OIA connector J19 torquing the captivated screws to 7-10 inch-pounds.

55. Connect Flexible Hose Assembly from the PSA Coolant Supply to the inlet and exit valves on the PSA cold plate.

Installation of D&C Electronics

56. Obtain D&C Electronics. Position it so that the mounting holes line up with the corresponding insert holes in the left hand structural support panel. Insert four screws and torque them to 15-20 inch-pounds.

57. Attach the left hand structural support panel to the G & N Mounting Fixture using hardware retained in step B.3. Tighten screws down snug.

58. Mate connector 56P1 to connector 50A3J1 on the D&C Electronics. Torque jacking screw to 5-7 inch-pounds.

Installation of Control Electronics

59. Obtain the Control Electronics Assembly and mount it on the right hand structural support with the four screws. Torque the screws to 15-20 inch-pounds.

60. Attach the right hand structural support panel to the G & N Mounting Fixture using hardware retained in step B.3. Tighten screws down snug.

61. Mate connector 56P10 to connector 50A4J1 on the Control Electronics Assembly. Torque the jacking screw to 5-7 inch-pounds.

Installation of G & N AGC DSKY

62. Install and secure AGC DSKY on upper right frame of G & N Mounting Fixture Cradle. Guide pins will insure proper positioning of DSKY. Torque eight captive bolts to 8-10 inch-pounds.

63. Hold and support 56J10 and screw AGC DSKY connector screw into 56J10 torquing the screw to 5-7 inch-pounds.

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64. Secure right D&C Harness Trunk (upper trunk) to right side of G & N Mounting Fixture Cradle torquing the clamp bolt down snug.

Installation of IMU Control Panel

65. Install and secure IMU Control Panel in upper left frame of G & N Mounting Fixture Cradle. Guide pins insure proper position of IMU Control Panel. Torque four captive screws to 8-10 inch-pounds.

66. Hold and support connector 56J6 and screw IMU Control Panel Connector screw into 56J6 torquing it to 5-7 inch-pounds.

67. Secure Map and Data Viewer and IMU Control Panel Trunk with its clamp at the upper left top of the G & N Mounting Fixture Cradle torquing the clamp bolt down snug.

Installation of CDU's

68. Install and secure CDU connectors 56J2, 56J1, 56J3, 56J4 and 56J5 in the listed order to the CDU Mounting Frame using special studs P/N 1016889 and flex lock nuts P/N AN365D-440 torqued to 5-7 inch-pounds.

69. Secure upper clamp to the J5, J4 harness and the lower clamp to the J3, J2, J1 harness torquing the clamp bolts down snug.

70. Obtain the five CDU Assemblies and insert them into place in sequence starting with the top and working down. Insert the tongue in the slot at the rear and then engage and torque the captivated jacking screws to 35-40 inch-pounds.

71. Obtain the CDU cover panel and fasten it in place over the CDU module boxes torquing the 4 captivated screws to 7-10 inch-pounds.

Installation of the Map and Data Viewer

72. Obtain the Map and Data Viewer and place it on the G & N Mounting Fixture insuring that the two guide pins enter the guide holes. Torque all four screws to 7-10 inch-pounds.

73. Mate connector 56J8 to connector P1. Open up the cartridge door and engage torque wrench in the socket head cap screw in the center of the connector. Torque the jacking screw to 5-7 inch-pounds.

74. Mount cable W32 to the bracket on the inside right hand wall of the G & N Mounting Fixture. Torque all screws to 7 - 10 inch-pounds.

75. Connect cable W32 to connector 56P9. Torquing jacking screw to 5-7 inch-pounds. Do not connect the other end of cable W32 to OIA connectors J6, J7 and J12 at this time.

Installation of AGC

76. Remove trays A, B, and C from the AGC frame.

77. Pick up the AGC frame by its handling fixture and slide it into the G & N Mounting

DATE ________

Fixture. Torque the holding screws to 40-50 inch-pounds.

78. Tilt the G & N Mounting Fixture to approximately 45° so that the access cover on right rear side of the AGC Handling Fixture is accessible. Remove access cover.

79. Insert Logic Tray C and torque jacking screw to 15-20 inch pounds. Mate connector 05A3P1 to connector 56J21 and connector 05A3P2 to 56J22. Torque the jacking screws to 5-7 inch-pounds. Replace access cover.

80. Insert Logic Tray A and Memory Tray B and torque jacking screws to 15-20 inch-pounds. Tilt G & N Mounting Fixture to approximately 0°.

81. Connect the Flexible Hose Ass'y from the AGC coolant supply to the inlet and exit valves of the AGC cold plate.

Installation of Main Panel DSKY

82. Install the Main Panel DSKY Stand in its place.

83. Mount the Main Panel DSKY on the stand torquing all screws to 7-10 inch-pounds.

Power Turn On of OIA

84. Place the Prime Power Circuit Breakers on the back of the OIA Coolant Supply and Oscillograph Consoles to ON.

85. Set ICTC POWER SWITCH on BATTERY POWER PACK (1900011-011) to OFF, if present in the configuration.

86. Set PTC Power Switch to OFF.

87. Remove PTC Power Cable connector P2 from connector J2 on the IMU.

88. Connect G & N System Harness cable connector 56P6 to connector J2 on the IMU.

89. Apply power to the TEMPERATURE MONITOR CONTROL panel by pressing the 115V 60 cps CONTROL SWITCH.

90. Set the ALARM DISABLE switch on the back of the MONITOR PANEL to ALARM ENABLE.

91. Set the MONITOR METER SELECT switch to AUX HTR CURRENT and observe presence of heater current as indicated on the MONITOR METER.

92. Set the MONITOR METER SELECT switch to AUX IRIG and observe that the indicated temperature on the MONITOR METER is within the range of -5 to +5°F.

Installation of Optics Shroud Assembly and Optics Eyepieces.

93. Obtain Optics Shroud Assembly and install on G & N Mounting Fixture. Torque all six captive screws to 8-10 inch-pounds.

94. Obtain Optics eyepieces and install on Sextant and Telescope. Tighten both eyepieces down finger tight.

Installation of the G & N Indicator-Control Panel

95. Position the G & N Indicator Control Panel near its mounting surface on the G & N Mounting Fixture. Reach underneath and mate connector 56J9 to connector 50A1P1. Torque jacking screw on the front of the G & N Indicator Panel to 5-7 inch-pounds.

96. Mount the G & N Indicator Control Panel insuring that the guide pins enter the guide holes. Torque the captivated screws to 7-10 inch-pounds.

DATE ________

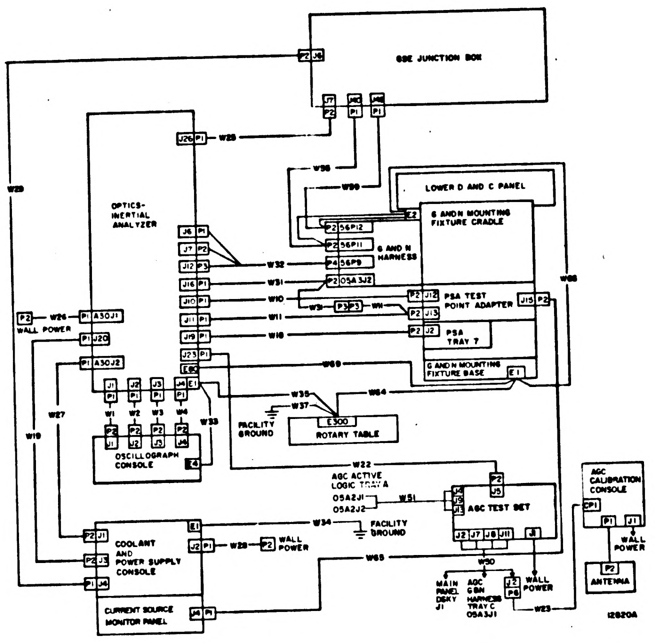
GSE JUNCTION BOX
OPTICS-INERTIAL ANALYZER
LOWER D AND C PANEL
G AND N MOUNTING FIXTURE CRADLE
G AND N HARNESS
PSA TEST POINT ADAPTER
PSA TRAY 7
G AND N MOUNTING FIXTURE BASE
WALL POWER
OSCILLOGRAPH CONSOLE
FACILITY GROUND
ROTARY TABLE
E300
AGC ACTIVE LOGIC TRAY A
05A2J1
05A2J2
AGC TEST SET
AGC CALIBRATION CONSOLE
ANTENNA
COOLANT AND POWER SUPPLY CONSOLE
CURRENT SOURCE MONITOR PANEL
MAIN PANEL DSKY J1
AGC GBN HARNESS TRAY C 05A3J1
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Figure 1. G & N Universal Test Station Cabling Diagram

DATE ______

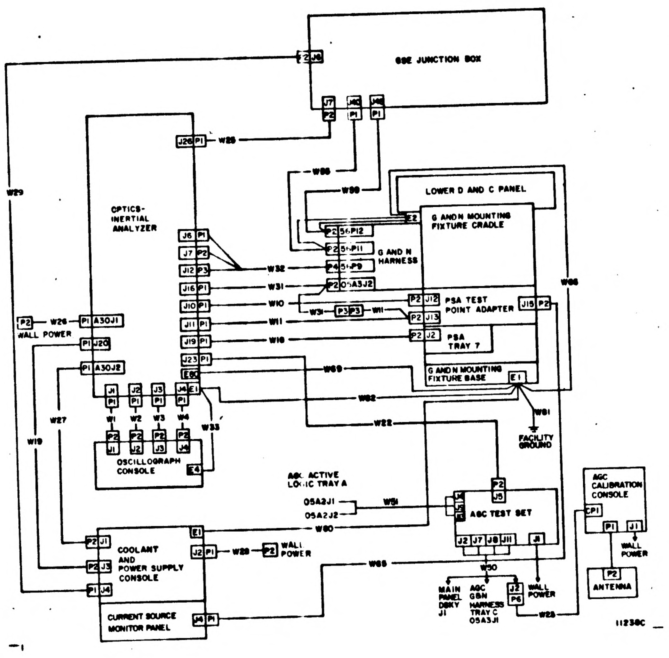
GSE JUNCTION BOX
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Figure 2. G & N System Test Station Cabling Diagram

DATE ______

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JOB ASSEMBLY AND PREPARATION OF G & N SYSTEM FOR TESTING

JDC 10005 **REV.** D **PAGE** 1 **OF** 10

INITIAL TDRR 05368 **D.S. PGS** –

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION Assembly of Guidance Components into a complete G & N System Test Configuration and preparation of GSE and G & N System for acceptance testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	7-7-64	10841			WK	JB
B	10-2-64	13221	All	-	WK	WJR
C	12-22-64	15019	2, 3, 5-8	-	WK	WJR
D	12-15-66	32309	10, 11	-	EA	-

REFERENCES

IMPORTANT: See below.

INTERVAL

TOOLS AND MATERIAL: See below.

TOOLS AND MATERIAL: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended may be substituted.

Item No.	Number Req'd	Description
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2	1	IMU and Optics Navigation Base Ass'y. Sling and Handling Fixture.
3	1	PSA End Connector and Cable Harness Handling Fixture.
4	1	G & N System Equipment #1014999 Dwg.

IMPORTANT: The G & N System must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G & N system and components. Performance of this JDC requires 3 men during steps B.3 through B.52.

A. SAFETY REQUIREMENTS

1. All circuit breakers supplying OIA power to G & N equipment shall be in the OFF position.

2. All signal carrying circuits beginning, terminating, or going thru the G & N

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ____

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equipment shall be de-energized, except for IMU auxiliary temperature control.

3. All tools shall be in proper operating condition.

4. A thorough visual examination of all equipment shall be performed to detect possible physical damage and to check for sharp edges and abrasion points which could be hazardous to personnel installing G & N equipment as well as to cable bundles, harnesses and connectors.

B. PROCEDURES

NOTE: All directions given are for a technician facing south in front of the G & N Mounting Fixture.

NOTE: Insure that the IMU has been purged and filled. If not, refer to JDC 18045 for procedures.

GSE-GSE Connections

1. Place Prime Power Circuit Breaker located on the back of the OIA console to OFF.

2. Insure that the following cables are connected. Insure that no other cables between the GSE J-Box and the GSE consoles are connected.

Cable No.	Drawing No.	From	To
W1	1900886	OIA J1	OSC CON J1
W2	1900669	OIA J2	OSC CON J2
W3	1900670	OIA J3	OSC CON J3
W4	1900671	OIA J4	OSC CON J4
W19	1900873	OIA J20	Coolant & Pwr CON J3
W22	1900959	OIA J28	CTS J5
W26	1900921	OIA A30J1	Wall Power
W27	1900871	OIA A30J2	Coolant & Pwr CON J1
W28	1900872	Coolant & Pwr CON J2	Wall Power
W29	1900879	Coolant & Pwr CON J4	GSE J-Box J6
PWR	--	CTS J1	Wall Power
W25	1900918	OIA J26	GSE J-Box Emergency Power Cable

Connect all ground cables as shown in figure 1 for a G & N Universal Test Station configuration or connect all ground cables as shown in figure 2 for a G & N Test Station configuration.

DATE ____

Installation of PSA End Connector and Cable Harness

3. Remove structural support panels from the G & N Mounting Fixture and retain hardware for use in step B.57 and B.60. Set G & N Mounting Fixture Cradle to approximately horizontal or 90° position.

4. Remove all screws holding the End Connector to the PSA End Connector and Cable Harness Handling Fixture (1901846).

5. Pick up the PSA End Connector and Cable Harness Handling Fixture and place it as far back as possible in the G & N Mounting Fixture.

6. Release the clamps holding the CDU wire trunk and the DSKY wire trunk.

7. With one man holding the CDU wire trunk and one man holding the AGC DSKY wire trunk, route the trunks through the left and right ports of the G & N Mounting Fixture as the PSA End Connector and Harness Trunk Handling Fixture is moved forward. When the End Connector is in its approximate position, set the PSA End Connector and Cable Harness Handling Fixture down.

8. Release all other clamps holding harness trunks.

9. With two men supporting harness trunks and the End Connector, remove the PSA End Connector and Cable Harness Handling Fixture.

10. Place PSA End Connector over mounting holes in G & N Mounting Fixture Cradle.

NOTE: If the alignment of the PSA Coldplate and the G & N Mounting Fixture cradle has been disturbed, it is necessary to insert the 2 outside screws (in the row of 4) through the bottom of the G & N Mounting Fixture into the PSA End Connector guide screw receptacles first. The remaining 4 screws are then inserted.

11. Install six 10-32, 1-1/2 inch socket head screws (MS16996-16) and 6 flat washers (AN960C10) to secure the PSA End Connector in the G & N Mounting Fixture Cradle. Torque screws to 20-25 inch-pounds.

12. Secure left D&C Harness Trunk (upper trunk) to left side of G & N Mounting Fixture Cradle torquing clamp bolts down snug.

Installation of Optics Navigation Base

13. Insure that the IMU mounting surfaces on the Navigation Base are clean and free of burrs after removing protective pads.

14. Install the Optics Navigation Base Handling Fixture (1901426) to the Navigation Base.

15. Install four eye bolts in the Optics Navigation Base Handling Fixture.

16. Attach the sling to the monorail hoist.

17. Attach the sling to the four eye bolts on the Optics Navigation Base Handling Fixture.

18. Raise the Optics Navigation Base Assembly from its container.

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19. Adjust the sling so that the Optics Navigation Base Assembly is approximately horizontal.

20. Remove the two upper and one lower pad and ball mount assemblies from the G & N Mounting Fixture.

21. Carefully examine the mating surfaces of the Optics Navigation Base and the ball mount assemblies to insure that they are clean and free of burrs.

22. Attach the ball mount assemblies to the Optics Navigation Base Assembly as illustrated. Tighten the six ball mount bolts finger tight.

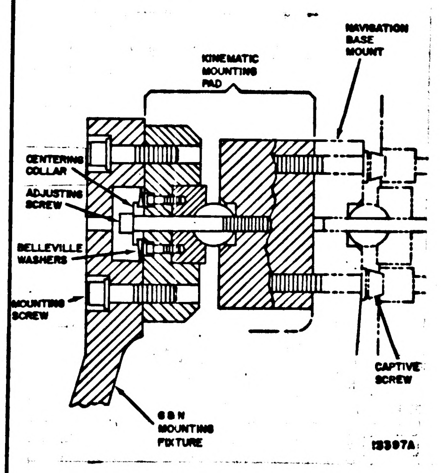
NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

23. Taking care to center the Belleville washers, torque the 3 adjusting screws for preloading the kinematic mount balls to 5-7 inch-pounds.

24. Carefully examine the mating surfaces of the mounting pads and the G & N Mounting Fixture frame to insure that they are clean and free from burrs.

25. Slowly and carefully move the Optics Navigation Base Assembly to the correct position over the G & N Mounting Fixture.

26. Lower the assembly slowly and carefully to its mating position over the G & N Mounting Fixture taking care to avoid interference with the PSA End Connector and Cable Harness.



Installation of Mounting Pads
(Cross-Sectional View)

27. When the locating pin holes of the 3 kinematic mount pads are lined up with the corresponding pins on the G & N Mounting Fixture complete the lowering of the assembly.

28. Install all six kinematic mount pad bolts finger tight.

29. Torque all 12 bolts, 6 for the 3 ball mounts and 6 for the pads, to 90-100 inch-pounds. Tighten the 3 adjusting screws for preloading the kinematic mount balls until centering collar bottoms. Loosen adjusting screws 1/8 turn.

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30. Remove the Optics Navigation Base Handling Fixture, P/N 1901426 from the Optics Navigation Base Assembly. Fasten Guard and Seal Assembly to G & N Mounting Fixture. Tighten the 2 screws down snug.

31. Secure left hand IMU Optics Cable Harness to the Optics Navigation Base.

32. Secure right hand IMU Optics Cable Harness to the Optics Navigation Base.

Installation of the IMU

33. Insure that the Portable Temperature Controller is attached to the IMU and is operating properly. See that the extension cable is coiled neatly, with no tangles so that it can be played out smoothly. Allow the IMU outer shell to cool to room temperature for 1 hour before installing in the G & N Mounting Fixture.

34. Carefully examine the Optics Navigation Base IMU mounting surfaces to insure that they are clean and free from burrs.

35. Install the four eye bolts to the IMU.

36. Attach the sling to the four eye bolts on the IMU.

37. Carefully hoist the IMU and position it above the G & N Mounting Fixture.

38. Remove protective mounting pads from IMU.

39. Transfer and lower the IMU into position so that the IMU mounting pads are approximately lined up with the Optics Navigation Base mounting pads.

40. Lower the IMU slowly insuring that the guide pins line up with the guide holes on the IMU mounting surface.

41. Lower the IMU into its final position.

42. Remove the sling and eye bolts from the IMU.

43. Torque each of the mounting bolts to 55-60 inch-pounds.

44. Set the tilt axis of the G & N Mounting Fixture to 0° (±1°).

NOTE: Loosen mounting bolts to insure that IMU is resting on alignment pins.

45. Torque the four IMU bolts to 195-200 inch-pounds in 25 inch-pound increments in the following sequence. Torque bolt in hole with locating pin first. Second torque bolt diagonally across from it. Third torque bolt in the slot. Fourth torque bolt diagonally across from it.

46. Fasten connector 56P5 on the end of the left hand cable to the Sextant connection 10J1.

47. Fasten connector 56P4 on the end of the left hand cable to the Sextant electronics package connector 10J2. Alternately, tighten each screw two turns until both are torqued down snug.

48. Fasten connector 56P8 on the end of the right hand cable to the Scanning Telescope connector 20J1.

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49. Mate the connectors 56P2, 56P7 and 56P3 on cable to IMU connectors 35J1, 35J4 and 35J3.

(NOTE: Connector 35J2 is not mated at this time because heaters must remain attached to power thru the portable temperature controller until power can be supplied by the GSE thru Tray 7 of the PSA.)

50. Remove Snap-On Bellows from IMU.

51. Connect flexible hose assy from IMU coolant supply outlet to inlet valve of IMU.

52. Connect flexible hose assy from IMU outlet valve to IMU coolant supply inlet.

Installation of PSA Trays

53. Obtain PSA Trays 1 thru 10 and insert in reverse sequence starting with Tray 10 using left hand to guide rear tongue into its slot and assist in mating the connectors. In turn, engage the captivated screws into toe plate inserts and torque each screw to 15-20 inch-pounds.

54. Mate connector W18-P2 with connector 45A7J2 and W18-P1 with OIA connector J19 torquing the captivated screws to 7-10 inch-pounds.

55. Connect Flexible Hose Assembly from the PSA Coolant Supply to the inlet and exit valves on the PSA cold plate.

Installation of D&C Electronics

56. Obtain D&C Electronics. Position it so that the mounting holes line up with the corresponding insert holes in the left hand structural support panel. Insert four screws and torque them to 15-20 inch-pounds.

57. Attach the left hand structural support panel to the G & N Mounting Fixture using hardware retained in step B. 3. Tighten screws down snug.

58. Mate connector 56P1 to connector 50A3J1 on the D&C Electronics. Torque jacking screw to 5-7 inch-pounds.

Installation of Control Electronics

59. Obtain the Control Electronics Assembly and mount it on the right hand structural support with the four screws. Torque the screws to 15-20 inch-pounds.

60. Attach the right hand structural support panel to the G & N Mounting Fixture using hardware retained in step B. 3. Tighten screws down snug.

61. Mate connector 56P10 to connector 50A4J1 on the Control Electronics Assembly. Torque the jacking screw to 5-7 inch-pounds.

Installation of G & N AGC DSKY

62. Install and secure AGC DSKY on upper right frame of G & N Mounting Fixture Cradle. Guide pins will insure proper positioning of DSKY. Torque eight captive bolts to 8-10 inch-pounds.

63. Hold and support 56J10 and screw AGC DSKY connector screw into 56J10 torquing the screw to 5-7 inch-pounds.

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64. Secure right D&C Harness Trunk (upper trunk) to right side of G & N Mounting Fixture Cradle torquing the clamp bolt down snug.

Installation of IMU Control Panel

65. Install and secure IMU Control Panel in upper left frame of G & N Mounting Fixture Cradle. Guide pins insure proper position of IMU Control Panel. Torque four captive screws to 8-10 inch-pounds.

66. Hold and support connector 56J6 and screw IMU Control Panel Connector screw into 56J6 torquing it to 5-7 inch-pounds.

67. Secure Map and Data Viewer and IMU Control Panel Trunk with its clamp at the upper left top of the G & N Mounting Fixture Cradle torquing the clamp bolt down snug.

Installation of CDU's

68. Install and secure CDU connectors 56J2, 56J1, 56J3, 56J4 and 56J5 in the listed order to the CDU Mounting Frame using special studs P/N 1016889 and flex lock nuts P/N AN365D-440 torqued to 5-7 inch-pounds.

69. Secure upper clamp to the J5, J4 harness and the lower clamp to the J3, J2, J1 harness torquing the clamp bolts down snug.

70. Obtain the five CDU Assemblies and insert them into place in sequence starting with the top and working down. Insert the tongue in the slot at the rear and then engage and torque the captivated jacking screws to 35-40 inch-pounds.

71. Obtain the CDU cover panel and fasten it in place over the CDU module boxes torquing the 4 captivated screws to 7-10 inch-pounds.

Installation of the Map and Data Viewer

72. Obtain the Map and Data Viewer and place it on the G & N Mounting Fixture insuring that the two guide pins enter the guide holes. Torque all four screws to 7-10 inch-pounds.

73. Mate connector 56J8 to connector P1. Open up the cartridge door and engage torque wrench in the socket head cap screw in the center of the connector. Torque the jacking screw to 5-7 inch-pounds.

74. Mount cable W32 to the bracket on the inside right hand wall of the G & N Mounting Fixture. Torque all screws to 7-10 inch-pounds.

75. Connect cable W32 to connector 56P9. Torquing jacking screw to 5-7 inch-pounds. Do not connect the other end of cable W32 to OIA connectors J6, J7 and J12 at this time.

Installation of AGC

76. Remove trays A, B, and C from the AGC frame.

77. Pick up the AGC frame by its handling fixture and slide it into the G & N Mounting

DATE ______

Fixture. Torque the holding screws to 40-50 inch-pounds.

78. Tilt the G & N Mounting Fixture to approximately 45° so that the access cover on right rear side of the AGC Handling Fixture is accessible. Remove access cover.

79. Insert Logic Tray C and torque jacking screw to 15-20 inch pounds. Mate connector 05A3P1 to connector 56J21 and connector 05A3P2 to 56J22. Torque the jacking screws to 5-7 inch pounds. Replace access cover.

80. Insert Logic Tray A and Memory Tray B and torque jacking screws to 15-20 inch-pounds. Tilt G & N Mounting Fixture to approximately 0°.

81. Connect the Flexible Hose Ass'y from the AGC coolant supply to the inlet and exit valves of the AGC coldplate.

Installation of Main Panel DSKY

82. Install the Main Panel DSKY Stand in its place.

83. Mount the Main Panel DSKY on the stand torquing all screws to 7-10 inch-pounds.

Power Turn On of OIA

84. Place the Prime Power Circuit Breakers on the back of the OIA Coolant Supply and Oscillograph Consoles to ON.

85. Set ICTC POWER SWITCH on BATTERY POWER PACK (1900011-011) to OFF, if present in the configuration.

86. Set PTC Power Switch to OFF.

87. Remove PTC Power Cable connector P2 from connector J2 on the IMU.

88. Connect G & N System Harness cable connector 56P6 to connector J2 on the IMU.

89. Apply power to the TEMPERATURE MONITOR CONTROL panel by pressing the 115V 60 cps CONTROL SWITCH.

90. Set the ALARM DISABLE switch on the back of the MONITOR PANEL to ALARM ENABLE.

91. Set the MONITOR METER SELECT switch to AUX HTR CURRENT and observe presence of heater current as indicated on the MONITOR METER.

92. Set the MONITOR METER SELECT switch to AUX IRIG and observe that the indicated temperature on the MONITOR METER is within the range of -5 to +5° F.

Installation of Optics Shroud Assembly and Optics Eyepieces

93. Obtain Optics Shroud Assembly and install on G & N Mounting Fixture. Torque all six captive screws to 8-10 inch-pounds.

94. Obtain Optics eyepieces and install on Sextant and Telescope. Tighten both eyepieces down finger tight.

Installation of the G & N Indicator-Control Panel

95. Position the G & N Indicator Control Panel near its mounting surface on the G & N Mounting Fixture. Reach underneath and mate connector 56J9 to connector 50A1P1. Torque jacking screw on the front of the G & N Indicator Panel to 5-7 inch-pounds.

96. Mount the G & N Indicator Control Panel insuring that the guide pins enter the guide holes. Torque the captivated screws to 7-10 inch-pounds.

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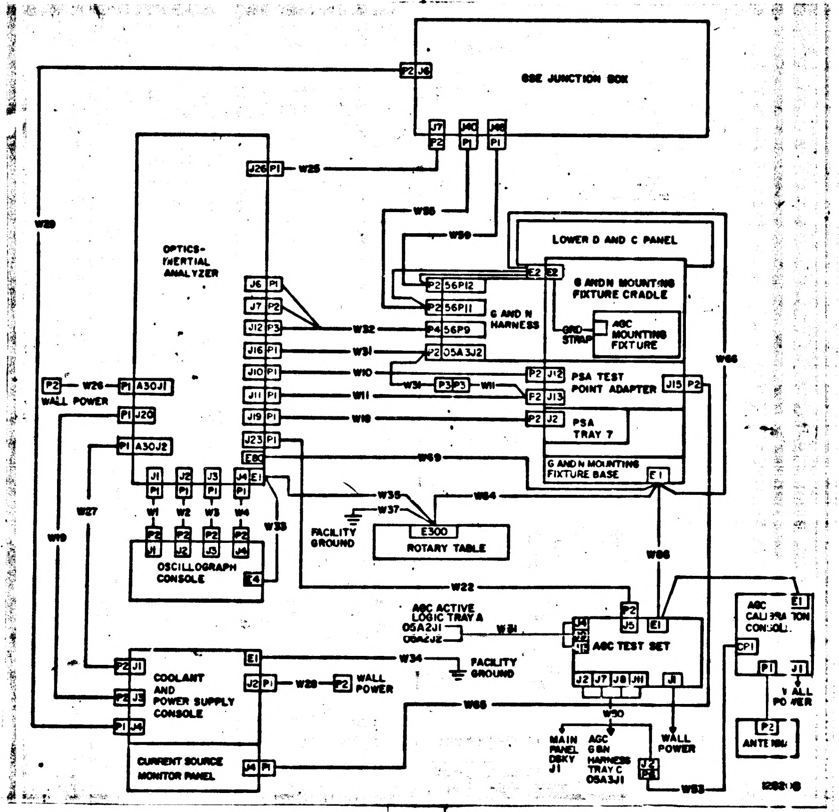
GSE JUNCTION BOX
OPTICS-INERTIAL ANALYZER
LOWER D AND C PANEL
G AND N MOUNTING FIXTURE CRADLE
G AND N HARNESS
GRD STRAP
AGC MOUNTING FIXTURE
PSA TEST POINT ADAPTER
PSA TRAY 7
G AND N MOUNTING FIXTURE BASE
ROTARY TABLE
E300
FACILITY GROUND
OSCILLOGRAPH CONSOLE
AGC ACTIVE LOGIC TRAY A
05A2J1
05A2J2
AGC TEST SET
AGC CALIBRATION CONSOLE
ANTENNA
COOLANT AND POWER SUPPLY CONSOLE
CURRENT SOURCE MONITOR PANEL
WALL POWER
MAIN PANEL DSKY J1
AGC G&N HARNESS TRAY C 05A3J1
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Figure 1. G & N Universal Test Station Cabling Diagram

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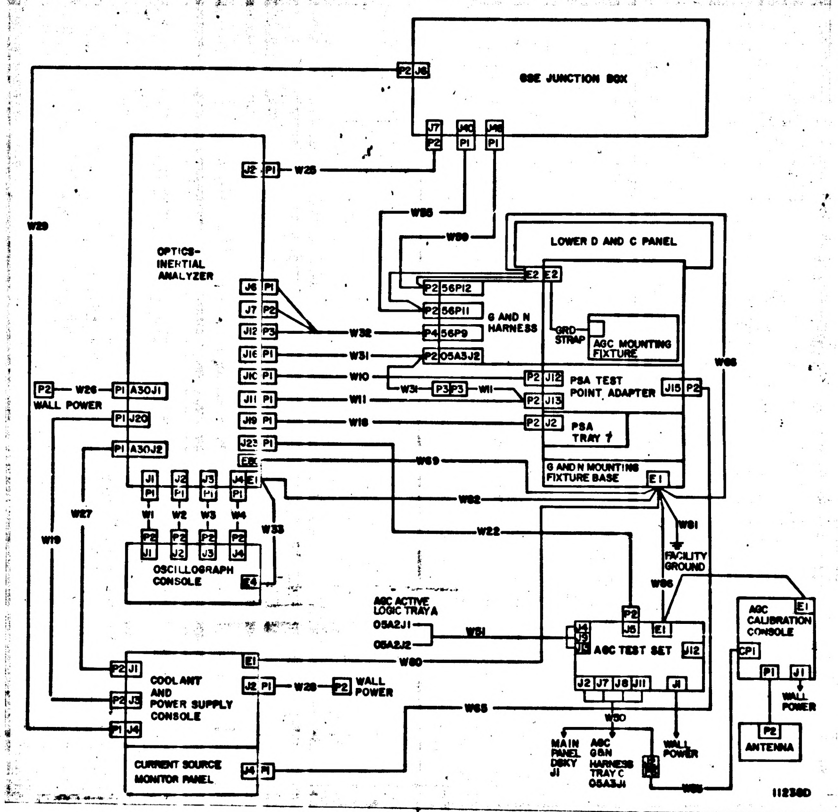
FORM 00109A
Chg. 5/12/64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OPTICS-INERTIAL ANALYZER
LOWER D AND C PANEL
G AND N HARNESS
GRD STRAP
AGC MOUNTING FIXTURE
PSA TEST POINT ADAPTER
PSA TRAY 7
G AND N MOUNTING FIXTURE BASE
FACILITY GROUND
OSCILLOGRAPH CONSOLE
AGC ACTIVE LOGIC TRAY A
05A2J1
05A2J2
AGC TEST SET
AGC CALIBRATION CONSOLE
ANTENNA
COOLANT AND POWER SUPPLY CONSOLE
CURRENT SOURCE MONITOR PANEL
WALL POWER
MAIN PANEL DSKY J1
AGC G&N HARNESS TRAY C 05A3J1
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Figure 2. G & N System Test Station Cabling Diagram

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FORM 00109A
Chg. 5/12/64

JOB: ASSEMBLY AND INSTALLATION OF G & N SYSTEM FOR ACCEPTANCE TESTING

TDRR 05368
JDC 10005 (Sheet 1 of 8)

SUBSYSTEM: G & N SYSTEM

ASSEMBLY:

DESCRIPTION: Assemble

TYPE:

INTERVAL:

TOOLS AND MATERIAL: See below.

REFERENCES:

IMPORTANT: See below.

TOOLS AND MATERIAL: Acceptable results are contingent upon the use of equipment and material equivalent to that listed below. If protection to equipment and personnel is not decreased, items equivalent to those recommended below may be substituted.

Item No.	Number Required	Description
1	1	Torque wrench range 1-250 inch lbs with adaptors
2	1	Laboratory cart
3	1	Crane 2 ton capacity
4	1	Coolant refrigeration cart
5	1	Coolant test fixture
6	1	Mobile power supply

IMPORTANT: The G & N system must be handled and installed with extreme care since it contains delicate, sensitive instruments and has critical mounting surfaces and vulnerable connector pins and sockets. The proper installation procedure and sequence is required to prevent possible damage or degradation of G & N system and components.

A. SAFETY REQUIREMENTS:

1. All circuit breakers supplying power to G & N equipment shall be in the "off" position.
2. All signal carrying circuits terminating, beginning, or going thru the G & N equipment shall be de-energized.
3. Ascertain that all tools are in proper operating condition.
4. Perform a thorough visual examination of all equipment to detect possible physical damage and check for sharp edges and abrasion points which could be hazardous to, personnel installing G & N equipment as well as to cable bundles and harnesses.
5. All connectors to the G & N Mounting fixture shall be removed.

B. PROCEDURES:

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1. Remove D & C Rack from G & N System Fixture frame. Store on bench or other work area. Procedures 6.0 through 6.7 may be performed simultaneously with the following procedures.

2. Position G & N System Fixture Frame vertically. (The G & N Mounting Fixture contains the necessary cold plates.)

2.1 Before installation of any parts examine the G & N System Fixture for loose particles, then vacuum all surfaces paying particular attention to corners and crevices.

3. Install PSA End Connector (PSA-EC) with attached G & N harness.

3.1 Use overhead crane to lift assembly so that the PSA-EC is located above the PSA cold plate.

3.2 While the PSA-EC is raised above PSA cold plate, feed CDU cable through access hold and pull it forward until the connectors are as far forward as possible without stretching cable.

3.3 Feed "IMU control panel cable" terminating in connector No. 56J6 through access hole and pull as far forward as possible without stretching cable.

3.4 Fasten cable to the left hand structural support panel starting from topmost cable clamp and work down in sequence locating the black positioning band under each cable clamp. Tighten cable clamp.

3.5 Feed power cable connectors No's 56P11 and 56P12 through access hole.

3.6 Feed "AGC control panel cable" - terminating in connector 56J10 through access hole and pull as far forward as possible without stretching cable.

3.7 Fasten cable to right hand structural support panel starting from topmost cable clamp and work down in sequence locating the black positioning band under each cable clamp.

3.8 Lower the PSA-EC carefully into place and rest it on the PSA thermal interface material.

3.9 Complete cable fastening to right and left hand structural supports.

3.10 Carefully position the PSA-EC back into its recess (loosening cable clamps as necessary to provide cable slack) until a drift pin can pass up through the hole in bottom of cold plate location. Enter and line up the precision hole in the bottom of PSA-EC.

3.11 Insert one PSA-EC left hand bolt up through cold plate and tighten finger tight.

3.12 Carefully insert 3 bolts up through cold plate and install them finger tight.

3.13 Insert the two PSA-EC right hand bolts up through cold plate and tighten finger tight.

3.14 Remove drift pin and insert 1 bolt up through cold plate into the precision hole in the PSA-EC and install finger tight.

3.15 Tighten all 8 bolts in 5 inch pound increments starting with bolt in the precision bolt hole and then tighten the diagonally opposite bolts in sequence until all bolts are tightened to 15(± 2) inch pounds.

3.16 Fasten toe cap to cold plate using 6 screws. Tighten to 10 inch pounds.

3.17 At opposite ends of toe cap, insert shims to fill gap, and fasten to structure with 4 screws and nuts tightened to___inch pounds.

4.0 Install Navigation Base-Optics Assembly.

4.1 Position G & N System Fixture Horizontally.

4.2 Attach Nav Base Jig to Navigation Base-Optics Assembly with four bolts.

4.3 Install 4 eye bolts in Nav. Base Jig.

4.4 Attach sling to hoist.

4.5 Attach sling to eye bolts.

4.6 Attach 3 Kinematic manuals to Navigation Base-Optics Assembly (2 bolts each).

4.7 Slowly and carefully move the nav base over frame and lower it into position so that the nav base is lined up with mounting holes.

4.8 Carefully examine mating surfaces of nav base mounts and frame mounting surface to insure that they are clean and free from "Burrs".

4.9 Slowly and carefully move nav base over and then around the "fanned out" cable harness of the PSA-EC.

4.10 When the mounting holes in the bottom shock mount are approximately lined up with the corresponding holes in the structure, install the bolts finger tight.

4.11 Install 4 bolts and 4 washers in the top two mounts through holes in nav base and tighten finger tight.

4.12 Install 4 bolts, 8 washers, and 4 nuts through holes in bottom mount bracket into the structure.

4.13 Tighten all bolts to 5 inch pounds in the following sequence 1, 3, 2, 4, 5, 8, 6, 7. Repeat the sequence in 5 inch pound increments until all bolts are tightened to 15 (± 2) inch pounds.

4.14 Secure left hand IMU. optics cable harness to nav base.

4.15 Secure the right hand IMU, computer control panel cable harness to nav base.

4.16 Fasten connector No. 56P5 on end of left hand cable to SXT connector No. 10J1.

4.17 Fasten connector No. 56P4 on the end of left hand cable to SXT electronics package connector No. 10J2. Alternately tighten each jack screw two turns until both are tightened to___inch pounds.

4.18 Fasten connector No. 56P8 on end of right hand cable to SCT connector No. 20J1.

4.19 Remove Nav. Base Jig.

5.0 Install IMU.

5.1 Insure that portable temperature controller is attached to IMU and is operating correctly. See that the extension cable is coiled neatly, with no tangles, so that it can be played out smoothly.

5.2 Examine IMU mounting pads for freedom from scratches and burrs.

5.3 Place IMU sling on hoist.

5.4 Mount the four eye bolts to the IMU.

5.5 Attach the IMU sling to the eye bolts.

5.6 Carefully hoist the IMU and position it above the G & N Mounting Fixture.

5.7 Translate and lower IMU into position so that the IMU mounting pads are approximately lined up with the nav base mounting pads and the coolant connection fittings are uppermost.

5.8 When one of the mounting surfaces of the

IMU is approximately three inches away from the corresponding mating surface on the nav base make final minute adjustments to insure that all 4 sets of mating surfaces are separated by the same distance, which shall be breater than 2 inches.

5.9 Move the IMU slowly the last 2 inches checking periodically to make sure the separation distance between the 4 sets of mounting pads shall decrease by the same amount.

5.10 When surfaces are finally mated the 4 captivated 5/16" machine bolts are tightened finger tight and the mating surfaces position is rechecked with angle mirror to ensure complete contact with no interferences except at mounting surfaces. Bolts are tightened to 200 inch pounds in 5 inch pound increments in sequence 1, 3, 4, 2.

5.11 Mate the connectors No's 56P2, 56P7, 56P3 on cable to IMU connectors 35J1, 35J4, 35J3, (note connector No. 35J2 is not mated at this time because the heaters must remain attached to power thru the portable temperature controller until power can be supplied thru tray No. 7 of the PSA).

5.12 Obtain "Hose Ass'y, Flexible, Optics Base to IMU" and connect it to "IMU Coolant Exit Fitting".

5.13 Obtain "Hose Ass'y flexible to optics base" and connect it to "Optics Base Coolant Exit Fitting".

5.14 Obtain "Hose Ass'y Flexible IMU" and connect it to IMU Coolant Inlet Fitting.

5.15 Obtain PSA tray No. 7, and plug it into the seventh from the left connector No. 56J17 of the PSA-EC being careful not to damage the interface material. Engage captivated screw into "toe plate insert" and tighten to 10 inch pounds.

5.16 Disconnect the portable temperature controller connector No._____from IMU connector No. 35J2 and quickly move it and plug it into connector No. 45A7J2 on the front of PSA tray No. 7. Connect free cable connector No. 56P8 to 35J2.

6.0 Assemble D & C Rack.

6.1 Obtain the D & C rack and place it on a separate work bench or cart.

6.2 The CDU frame shall be positioned on the CDU shelf so that the cold plate mating surface is parallel to the CDU cold plate and so that the mounting hole for connector J-1 is uppermost.

6.3 Fasten CDU frame to left hand structural support panel using 6 screws tightened to 5 inch pounds.

6.4 Obtain D & C electronics (left hand turret) Lift it up until the mounting holes line up with the corresponding insert holes in the left hand structural support panel. Hold it in place with one hand while inserting and tightening, finger tight, 4 screws with the other hand.

6.5 Tighten all 4 screws to 10 (± 1) inch pounds in 2 inch pound increments in the following sequence 1, 3, 4, 2.

6.6 Obtain the control electronics (right side) Lift it up until the mounting holes line up with corresponding insert holes in right hand structural support panel. Hold it in place while inserting and tightening finger tight four screws.

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PHOTOGRAPHIC SCALE ONLY

6.7 Tighten all four screws to 10 (± 1) inch pounds in the following sequence, 1, 3, 4, 2, in two inch pound increments.

7.0 Install D & C Rack.

7.1 Transfer D & C Rack on over head crane to G & N System fixture frame and position directly over frame.

7.2 Slowly and carefully lower D & C rack to frame and secure with 8 bolts.

7.3 Connector No. 56J1 at the end of the first branch of CDU cable is properly oriented so that connector pins No's 1 to 50 are uppermost and are fastened to the CDU frame in the bottom connector opening using 2 special bolts and 2 self-locking nuts tightened to 5 inch pounds.

7.4 Connector No. 56J2 at the end of the second branch of CDU cable is properly oriented so that connector pins No's 1 to 50 are uppermost and is fastened to the CDU frame in the second from the bottom connector opening using 2 special bolts and 2 self-locking nuts tightened to 5 inch pounds.

7.5 Connector No. 56J3 at the end of the third branch of CDU cable is properly oriented so that connector pins No's 1 to 50 are uppermost and is fastened to the CDU frame in the third from the bottom connector opening using 2 special bolts and 2 self-locking nuts tightened to 5 inch pounds.

7.6 Connector No. 56J4 at the end of the fourth branch of CDU cable is properly oriented so that connector pins No's 1 to 50 are uppermost and is fastened to the CDU frame in the fourth from the bottom connector opening using 2 special bolts and 2 self-locking nuts tightened to 5 inch pounds.

7.7 Connector No. 56J5 at the end of the fifth branch of CDU cable is properly oriented so that connector pins No's 1 to 50 are uppermost and is fastened to the CDU frame in the top connector opening using 2 special bolts and 2 self locking nuts tightened to 5 inch pounds.

7.8 Fasten the cable harness to the CDU frame using clamps attached to the frame.

7.9 Lift connector No. 56P1 and mate it to connector No. 50A3J1 on the D & C electronics.

7.10 Engage torque wrench in the socket head cap screw in the center of the connector. Turn clockwise, carefully mating the connectors until 7 (± 1) inch pound torque is indicated.

7.11 Lift connector No. 56P9 and mate it to connector No. 45A11J1 on control electronics assembly right side.

7.12 Engage torque wrench in socket head cap screw in the center of connector. Turn clockwise, carefully mating the connectors until 7(±1) inch pounds of torque is indicated.

7.13 Lift connector No. 56P10 and mate it to connector No. 5044 on control electronics assembly right side.

7.14 Engage torque wrench in the socket head cap screw in the center of the connector. Turn clockwise, carefully mating the connector until 7 (± 1) inch pounds of torque is indicated.

8.0 Install AGE Control Panel.

8.1 Obtain the AGC display panel and lift it up until the 2 guide pins enter holes, hold in place with left hand while inserting and tightening finger tight 4 screws with right hand, switch hand positions and hold the AGC display panel in place with right hand while inserting and tightening finger tight 4 screws with left hand.

8.2 Tighten all 8 screws to 10(±1) inch pounds, in the following sequence, in 2 inch pound increments, 1, 5, 8, 4, 7, 3, 2, 6.

8.3 Engage connector 56J10 by hand.

8.4 Engage torque wrench in the socket head cap screw in center of connector. Turn clockwise carefully until 7 (± 1) inch pounds torque is indicated.

9.0 Install IMU Control Panel.

9.1 Obtain the IMU control panel and lift it up and insert it in its recess. Hold it in place with the left hand while inserting and tightening finger tight 2 screws with right hand. Switch hand positions and hold the IMU control panel with right hand while inserting and tightening finger tight 2 screws with left hand.

9.2 Engage connector No. 56J6 by hand.

9.3 Engage torque wrench in the socket head cap screw in the center of the connector, turn clockwise carefully until 7 (± 1) inch pounds torque is indicated.

9.4 Tighten all 4 screws, with torque wrench to 10 (± 1) inch pounds, in two inch pound increments in the following sequence 1, 3, 4, 2.

10.0 Install CDU's.

10.1 Obtain the 5 CDU modules and insert them into place in sequence working from top to bottom. Insert the tongue in slot at the rear and then engage and tighten capitivated screws in the inserts of the toe cap to 10 (± 1) inch pounds.

10.2 Obtain the CDU cover panel and fasten it in place over CDU module boxes holding it in place with one hand while tightening 6 capitivated screws finger tight with other hand.

10.3 Tighten the captivated screws, increments of 2 inch pounds, in the following sequence: 1, 4, 3, 6, 2, 5 until all are tightened to 10 (± 1) inch pounds.

11.0 Install AGC End Connector.

11.1 Obtain AGC end connector junction box; fit it into the AGC recess, being careful not to damage the thermal interface material. Fasten it into place by installing 8 screws 10-32 flathead, 4 in the top, 4 in the bottom tightened to 5 inch pounds.

11.2 Obtain Jig No.____ (to position AGC toe cap) and AGC toe cap. Fasten jig to toe cap with 2 screws. Insert jig and toe cap into position. Fasten toecap to cold plate using ____ screws____ tightened to____ inch pounds. Remove jig assembly screws and jig.

12.0 Install Optical Shroud.

12.1 Obtain optics shroud and fasten to secondary structure with the captive screws tightened to 5 inch pounds in sequence as follows 1, 4, 2, 3.

12.2 The NVE connector No. 56J7 with its mounting plate is fed up into position inside the optics shroud and is fastened into place with four screws tightened finger tight while observing progress through the optics shroud front opening. Then tighten to 5 inch pounds.

12.3 Obtain optics cover and fasten it to the optics shroud with the 4 captive screws tightened to 5 inch pounds in the following sequence 1, 4, 2, 3.

13.0 Install Map & Data Viewer.

13.1 Orient connector 56J5 for the Map and Data Viewer so that pins No's____ are uppermost and fasten it to the bracket on the left hand structural support panel using 2 bolts and 2 self locking nuts tightened to 15 (± 2) inch pounds.

13.2 Check location of connector with respect to Map and Data Viewer guide pin and mounting holes in structure using tool No.____.

13.3 Obtain the Map and Data Viewer and lift it up until the 2 guide pins enter holes. Hold in place with left hand while inserting and tightening finger tight 2 screws with right hand. Switch hand positions and hold the Map and Data Viewer in place with right hand while inserting and tightening finger tight 2 screws with left hand.

13.4 Tighten all 4 screws with torque wrench to 10 (± 1) inch pounds, in 2 inch pound increments.

13.5 Open up the cartridge door and engage torque wrench in the socket head cap screw in the center of the connector. Turn clockwise carefully mating the connectors until 7 (± 1) inch pounds torque is indicated.

14.0 Install G & N Indicator-Control Panel.

14.1 Obtain the G & N indicator control panel and carefully lift it up until two guide pins enter holes, and the captivated screws are located directly over the corresponding inserts in the secondary structure. Hold it in place with one hand and tighten finger tight the screws with other hand.

14.2 Engage connector 56J9 by hand.

14.3 Engage torque wrench in socket head cap screw in the center of connector, turn clockwise carefully until 7 (± 1) inch pounds torque is indicated.

14.4 Insert the torque wrench into the socket head cap screw in the center of the connector and slowly tighten to 7 (±1) inch pounds. Then tighten the panel holding screws in 2 inch ounce increments; in the following sequence 1, 4, 3, 6, 2, 5, until all are tightened to 10 (± 1) inch pounds.

15.0 Install AGC Modules.

15.1 Obtain AGC tray No. C and guide the rear tongue into its slot and assist in mating the connectors 05A584. Engage captivated screw into toe plate insert and tighten to 7 (± 1) inch pounds.

15.3 Insert torque wrench in turn into socket head cap screws in center of connectors 05A5P4 and 05A5P3 and slowly tighten to 7 (± 1) inch pounds.

15.4 Attach connectors No. 05A3P1 and 05A3P2 in the back of AGC tray No. C through the access hole in the D-ring to connectors 56J21 and 56J22 located in the bottom of the PSA-EC.

15.5 Insert torque wrench in turn into the socket head cap screws in the center of connectors No's. 05A3P1 and 05A3P2 and slowly tighten to 7 (± 1) inch pounds.

15.6 Obtain AGC active tray No. A and install it in place alongside tray No. C. Use left hand to guide rear tongue into its slot and assist in mating connectors, engage captivated screw into toe plate insert and tighten to____ inch pounds.

15.7 Obtain AGC active tray No. B and install it in place next to active tray No. A. Use left hand to guide rear tongue into its slot and assist in mating the connectors. Engage captivated screw into toe plate insert and tighten to____ inch pounds.

15.8 Obtain AGC spare tray No. A and install it next to active tray B. Install spare tray B in remaining space. Engage captivated screws in both spare trays No. A and No. B into toe plate inserts and tighten to____ inch pounds.

16.0 Install PSA Trays.

16.1 Obtain remaining PSA trays No's 1 thru 6 and 8 thru 10 and insert in reverse sequence starting with No. 10 using left hand to guide rear tongue into its slot and assist in mating the connectors. In turn engage captivated screws into toe plate inserts and tighten each to 10 (± 1) inch pounds.

17.0 Install Eye Pieces.

17.1 Remove and store optics cover and screws.

17.2 Install each optics eyepiece.

18.0 Exercise.

18.1 Be certain all power is off to the GSE except the heater power for the IMU. Operate all switches and controls to all positions to ascertain that they function mechanically without difficulty or hesitation (this exercise is to determine that no cables are twisted out of position so as to interfere with switch or control operation). Return all switches to the "off" or "neutral position". Return all control knobs to positions indicated on drawing No.

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

JOB: PIPA SCALE FACTOR TEST

JDC 10029 (Sheet 1 of 3)

SUBSYSTEM: G & N SYSTEM

ASSEMBLY:

DESCRIPTION: The test demonstrates each PIPA scale factor in a one g field by aligning each PIPA IA to local gravity. The alignment process is manual and calculations are performed in AGC.

TYPE: Test

INTERVAL:

TOOLS AND MATERIAL: GSE-Junction Box Assembly, Optical Inertial Analyzer, G & N Mounting Fixture, G & N Coolant & Power Console, and Data Sheet Form JDC-D-10029

REFERENCES: Paragraphs 3-3.5.1, 3-3.5.2, 3-3.11.2, and 3-3.11.3 of ATP 1015000

IMPORTANT: Performance of JDC 10013 required before proceeding with this JDC.

1. Set TRANSFER switch on IMU CONTROL panel to MANUAL.
2. Enter (and verify) VERB 25, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 21-01 (flashing).
3. Enter address ——— 8 into G & N AGC DSKY. Press ENTER pushbutton.
4. Enter HIG into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 22-01 (flashing).
5. Enter LOG into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 23-01 (flashing).
6. Enter ω_e in G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 23-01 and the AGC display shall indicate HIG, LOG and ω_e in rows 1, 2, and 3 respectively.
7. Enter (and verify) VERB 25, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 21-01 (flashing).
8. Enter address ——— 8 into G & N AGC DSKY. Press ENTER pushbutton.
9. Enter IRIG scale factor constant into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 22-01 (flashing).
10. Enter HISINLAM into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 23-01 (flashing).
11. Enter LOSINLAM into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 23-01 and the AGC display shall indicate IRIG scale factor, HISINLAM, LOSINLAM in rows 1, 2 and 3 respectively.
12. Enter (and verify) VERB 24, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 21-01 (flashing).
13. Enter address ——— 8 into G & N AGC DSKY. Press ENTER pushbutton.
14. Enter HICOSLAM into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 22-01 (flashing).
15. Enter LOCOSLAM into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 22-01 and the AGC

JOB: PIPA SCALE FACTOR TEST

JDC 10029 (Sheet 2 of 3)

display shall indicate HICOSLAM and LOCOSLAM in rows 1 and 2 respectively.

16. Enter (and verify) VERB —, NOUN — into G & N AGC DSKY to initiate scale factor test. Press ENTER pushbutton.
17. Enter X PIPA address as listed in table 1 into G & N AGC DSKY. Press ENTER pushbutton.
18. Press ZERO ENCODER pushbutton on IMU CONTROL panel. Wait one minute.
19. Press the following pushbuttons on the IMU CONTROL panel at 10 second intervals:
    - COARSE ALIGN
    - FINE ALIGN
    - MANUAL CDU.
20. Using CDU slew switches, set CDU's to INITIAL CDU ANGLES indicated in table 1. Press MANUAL ALIGN pushbutton on IMU CONTROL panel.
21. Press and hold MANUAL ALIGN pushbutton on IMU CONTROL panel while adjusting CDU thumbwheels (nulling horizontal PIPA IA's) until last digit in AGC display rows 1 and 2 remains unchanged for one minute. Press ENTER pushbutton.
22. The Scale Factor test is complete when the VERB-NOUN display flashes. Record t_1 as indicated in AGC display rows 1 and 2.
23. Using CDU slew switches, set CDU's to FINAL CDU ANGLES as indicated in table 1. Press MANUAL ALIGN pushbutton on IMU CONTROL panel and ENTER pushbutton on G & N AGC DSKY.
24. The second scale factor test is complete when the VERB-NOUN display flashes. Record t_2 as indicated in AGC display rows 1 and 2.

Table 1

PIPA	ADDRESS	INITIAL CDU ANGLE	FINAL CDU ANGLE
X	——— 8	IG 033.000 MG 000.000 OG 000.000	IG 213.000 MG 000.000 OG 000.000
Z	——— 8	IG 303.000 MG 000.000 OG 000.000	IG 123.000 MG 000.000 OG 000.000
Y	——— 8	IG 000.000 MG 033.000 OG 270.000	IG 000.000 MG 327.000 OG 090.000

JOB: PIPA SCALE FACTOR TEST

JDC 10029 (Sheet 3 of 3)

25. Press ENTER pushbutton on G & N AGC DSKY.
26. The average scale factor has been calculated when the VERB-NOUN display flashes. Record average scale factor as indicated in AGC display rows 1 and 2.
27. Repeat steps 16 through 26 for the Z PIPA.
28. Repeat steps 16 through 26 for the Y PIPA.
29. At completion of desired number of tests enter (and verify) VERB —, NOUN — into G & N AGC DSKY (terminate test). Press ENTER pushbutton.

TEST DATE: **OPERATOR:**

JDC-D-10029 **REV**

JOB: PIPA SCALE FACTOR TESTS

SHEET 1 **OF** 1

DESCRIPTION:

G AND N SYSTEM NO.

JDC REF NO. 10029 **REV**

JDC ITEM NUMBER	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
22	PLUS SF_x (t_1)								
24	MINUS SF_x (t_2)								
26	AVERAGE SF_x								
27	PLUS SF_z (t_1)								
27	MINUS SF_z (t_2)								
27	AVERAGE SF_z								
28	PLUS SF_y (t_1)								
28	MINUS SF_y (t_2)								
28	AVERAGE SF_y								
2, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15	AGC DISPLAYS	All indicated DISPLAYS responded as required.							

*To be used as required or desired

REMARKS:

INCHES
0 1 2
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JOB G & N SYSTEM FINE ALIGNMENT TEST

JDC 10031 REV. A PAGE 1 OF 1

INITIAL TDRR 05368 D.S. PGS 8

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION The test verifies ability of G & N system to align to a reference coordinate system. The reference coordinate system is established by optical sightings.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	7/7/64	10863	1	8	WK	

REFERENCES

IMPORTANT

INTERVAL

TOOLS AND MATERIAL

IMPORTANT: If it is desired to run this JDC without having run JDC 10030, use JDC steps 1 through 40 for positions 1 through 6.

1. Using calculation sheets perform calculation (a).
2. Using data calculation sheet for position 1 through 6 of JDC 10030, perform calculation (b) through (g).
3. Perform calculation (h) on calculation sheet and record on data sheet.
4. Perform calculation (i) on calculation sheet and record on data sheet.
5. Perform calculation (j) on calcuation sheet and record on data sheet.

TABLE 1

TEST LOCATION	$\frac{(We)^2}{4} \sin 2\lambda \; \left(\frac{rad^2}{sec^2}\right)$
ACSP	1.3258×10^{-9}
NAA	1.2311×10^{-9}
MIT	1.3237×10^{-9}
MSC	1.1408×10^{-9}
AMR	to be defined

6. Perform calculation (k) on calculation sheet and record on data sheet.
7. Perform calculation (l) on calculation sheet and record on data sheet.
8. Perform calculation (m) on calculation sheet and record on data sheet.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 8

JDC
NO. 10031
REV. A
INITIAL TDRR 05368

JOB G & N SYSTEM FINE ALIGNMENT

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG. ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME / AFFILIATION APPROVED BY ______ NAME / AFFILIATION

JDC ITEM NO.	PARAMETER I N	UNITS	MAX VALUE	RECORDED VALUES	REJ	AGC
3	H_{XZ} (misalign in XZ plane)	radians				
	H_{XY} (misalign in XY plane)	radians				
4	I_{XY} (misalign in XY plane)	radians				
	I_{XZ} (misalign in XZ plane)	radians				
5	J_{YX} (misalign in YX plane)	radians				
	J_{YZ} (misalign in YZ plane)	radians				
6	K_{YZ} (misalign in	radians				
	K_{YX} (misalign in YX plane)	radians				
7	L_{ZY} (misalign in ZY plane)	radians				
	L_{ZX} (misalign in ZX plane)	radians				
8	M_{ZX} (mislaign in ZX plane)	radians				
	M_{ZY} (misalign in ZY plane)	radians				

DATE ______

TDRR 10863 JUL 7 1964

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 8

CONFIDENTIAL
(WHEN FILLED IN)

JDC
NO. 10031
REV. A

JOB: OPERATOR

CALCULATION SHEET

CALCULATION
(a)

$$A_X = \frac{(\quad)\ \text{JDC 10029, Item 65. c}\ C_x}{2(\quad)\ \text{local gravity Table 3 JDC 10030}} =$$

$$A_Y = \frac{(\quad)\ \text{JDC 10029 Item 65. c}\ C_y}{2(\quad)\ \text{local gravity Table 3 JDC 10030}} =$$

$$A_Z = \frac{(\quad)\ \text{JDC 10029 Item 65. c}\ C_z}{2(\quad)\ \text{local gravity Table 3 JDC 10030}} =$$

CALCULATION
(b)

$B_1 = 3\,\Delta P_1\,(E) - \Delta P_2\,(E) =$
(Calculation c JDC 10030, Position 1) (Calculation f JDC 10030, Position 1)

$B_2 = 3\,\Delta P_1\,(E) - \Delta P_2\,(E) =$
(Calculation c JDC 10030, Position 2) (Calculation f JDC 10030, Position 2)

$B_3 = 3\,\Delta P_1\,(E) - \Delta P_2\,(E) =$
(Calculation c JDC 10030, Position 3) (Calculation f JDC 10030, Position 3)

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DATE ______

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 8

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JDC
NO. 10031
REV. A

JOB: OPERATOR

CALCULATION SHEET

$B_4 = 3\,\Delta P_1\,(E) - \Delta P_2\,(E) =$
(Calculation c JDC 10030, Position 4) (Calculation f JDC 10030, Position 4)

$B_5 = 3\Delta P_1\,(E) - \Delta P_2\,(E) =$
(Calculation c JDC 10030, Position 5) (Calculation f JDC 10030, Position 5)

$B_6 = 3\,\Delta P_1\,(E) - \Delta P_2\,(E) =$
(Calculation c JDC 10030, Position 6) (Cacluation f JDC 10030, Position 6)

CALCULATION
(c)

$$C_1 = \frac{B_1}{\Delta t_2} =$$
(Calculation e JDC 10030, Position 1)

$$C_2 = \frac{B_2}{\Delta t_2} =$$
(Calculation e JDC 10030, Position 2)

$$C_3 = \frac{B_3}{\Delta t_2} =$$
(Calculation e JDC 10030, Position 3)

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DATE ______

INCHES
0 1 2
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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 8
JOB: OPERATOR

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(WHEN FILLED IN)

JDC
NO. 10031
REV. A

CALCULATION SHEET

$C_4 = \frac{B_4}{\Delta t_2}$ =
(Calculation e JDC 10030, Position 4)

$C_5 = \frac{B_5}{\Delta t_2}$ =
(Calculation e JDC 10030, Position 5)

$C_6 = \frac{B_6}{\Delta t_2}$ =
(Calculation e JDC 10030, Position 6)

CALCULATION (d)

$D_1 = 3\,\Delta P_1\,(S) - \Delta P_2\,(S)$ =
(Calculation d JDC 10030, Position 1) (Calculation g JDC 10030, Position 1)

$D_2 = 3\,\Delta P_1\,(S) - \Delta P_2\,(S)$ =
(Calculation d JDC 10030, Position 2) (Calculation g JDC 10030, Position 2)

$D_3 = 3\,\Delta P_1\,(S) - \Delta P_2\,(S)$ =
(Calculation d JDC 10030, Position 3) (Calculation g JDC 10030, Position 3)

$D_4 = 3\,\Delta P_1\,(S) - \Delta P_2\,(S)$ =
(Calculation d JDC 10030, Position 4) (Calculation g JDC 10030, Position 4)

$D_5 = 3\,\Delta P_1\,(S) - \Delta P_2\,(S)$ =
(Calculation d JDC 10030, Position 5) (Calculation g JDC 10030, Position 5)

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DATE ________

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 8
JOB: OPERATOR

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JDC
NO. 10030
REV. A

CALCULATION SHEET

$D_6 = 3\,\Delta P_1\,(S) - \Delta P_2\,(S)$ =
(Calculation d JDC 10030, Position 6) (Calculation g JDC 10030, Position 6)

CALCULATION (e)

$E_1 = \frac{D_1}{\Delta t_2}$ =
(Calculation e JDC 10030, Position 1)

$E_2 = \frac{D_2}{\Delta t_2}$ =
(Calculation e JDC 10030, Position 2)

$E_3 = \frac{D_3}{\Delta t_2}$ =
(Calculation e JDC 10030, Position 3)

$E_4 = \frac{D_4}{\Delta t_2}$ =
(Calculation e JDC 10030, Position 4)

$E_5 = \frac{D_5}{\Delta t_2}$ =
(Calculation e JDC 10030, Position 5)

CONFIDENTIAL
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DATE ________

TDRR 10863 JUL 7 1964

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 8
JOB: OPERATOR

CONFIDENTIAL
(WHEN FILLED IN)

JDC
NO. 10031
REV. A

CALCULATION SHEET

$E_6 = \frac{D_6}{\Delta t_2}$ =
(Calculation e JDC 10030, Position 6)

CALCULATION (f)

$F_1 = (\quad) \cdot (\Delta t_2)^2$ =
(local latitude Table 1) (Calculation i JDC 10030, Position 1)

$F_2 = (\quad) \cdot (\Delta t_2)^2$ =
(local latitude Table 1) (Calculation i JDC 10030, Position 2)

$F_3 = (\quad) \cdot (\Delta t_2)^2$ =
(local latitude Table 1) (Calculation i JDC 10030, Position 3)

$F_4 = (\quad) \cdot (\Delta t_2)^2$ =
(local latitude Table 1) (Calculation i JDC 10030, Position 4)

$F_5 = (\quad) \cdot (\Delta t_2)^2$ =
(local latitude Table 1) (Calculation i JDC 10030, Position 5)

$F_6 = (\quad) \cdot (\Delta t_2)^2$ =
(latitude local Table 1) (Calculation i JDC 10030, Position 6)

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 8
JOB: OPERATOR

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JDC
NO. 10031
REV. A

CALCULATION SHEET

CALCULATION (g)

$G_1 = A_Y \cdot E_1$ =

$G_2 = A_Z \cdot E_2$ =

$G_3 = A_Z \cdot E_3$ =

$G_4 = A_X \cdot E_4$ =

$G_5 = A_X \cdot E_5$ =

$G_6 = A_Y \cdot E_6$

CALCULATION (h)

$H_{XZ} = A_Z\,C_1$ =

$H_{XY} = G_1 + F_1$

CALCULATION (i)

$I_{XY} = A_Y\,C_2$ =

$I_{XZ} = G_2 + F_2$

CALCULATION (j)

$J_{YX} = A_X\,C_3$ =

$J_{YZ} = G_3 + F_3$

CALCULATION (h)

$K_{YZ} = A_Z\,C_4$ =

$K_{YX} = G_4 + F_4$

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DATE ________

INCHES
0 1 2
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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 8

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REV. A

JOB: OPERATOR

CALCULATION SHEET

CALCULATION

(l) $L_{ZY} = A_Y C_5 =$

$L_{ZX} = G_5 + F_5$

(m) $M_{ZX} = A_X C_6 =$

$M_{ZY} = G_6 + F_6$

CONFIDENTIAL
(WHEN FILLED IN)

DATE ______

TDRR 05368

JOB: G & N SYSTEM FINE ALIGNMENT	**JDC** 10031 (Sheet 1 of 2)
SUBSYSTEM: G & N SYSTEM	**ASSEMBLY:**
DESCRIPTION: The test verifies ability of G & N system to align to a reference coordinate system. The reference coordinate system is established by optical sightings.	**TYPE:** Test **INTERVAL:**
TOOLS AND MATERIAL: GSE-Junction Box Assembly, Optical Inertial Analyzer, G & N Mounting Fixture, G & N Coolant & Power Console, 5-inch Autocollimator, 2-1/2-inch Autocollimator (SXT), 0° Autocollimator Plate, 45° Autocollimator Plate, and Data Sheet Form JDC-D-10031	**REFERENCES:** Paragraph 3-3.9 of ATP 1015000
IMPORTANT: Performance of JDC 10013 before proceeding with this JDC.	

1. Set TRANSFER switch on IMU CONTROL panel to COMPUTER.

2. Enter (and verify) VERB _, NOUN _ into G & N AGC DSKY. The VERB-NOUN display shall indicate ____ when the FINE ALIGNMENT test is initiated.

3. Enter (and verify) VERB 31, NOUN _ into G & N AGC DSKY. The VERB-NOUN display shall indicate 31___ .

4. Set switches on the G & N indicator control panel as follows:

   SLAVE TELESCOPE to STAR LOS
   CONTROLLER SPEED to MED
   CONTROLLER MODE to DIRECT.

5. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and after one minute return selector to MANUAL.

6. Using control stick, drive STLOS until 2X TRUNNION CDU indicates 66.000°.

7. Set CONTROLLER SPEED selector on G & N indicator control panel to LOW.

8. Sight through SXT eyepiece and drive STLOS until the central dot of 5 inch autocollimator reticle pattern is superimposed on center of SXT reticle pattern. Press MARK pushbutton on G & N AGC DSKY.

9. Set CONTROLLER SPEED selector on G & N indicator control panel to MED.

10. Using control stick, drive STLOS until 2X TRUNNION CDU indicates 103° and SHAFT ANGLE CDU indicates 61°.

11. Set switches on G & N indicator control panel as follows:

    CONTROLLER SPEED to LOW
    CONTROLLER MODE to RESOLVED.

12. Sight through SXT eyepiece and drive STLOS until central dot of 2.5 inch autocollimator reticle pattern is superimposed on center of SXT reticle pattern. Press MARK pushbutton on G & N AGC DSKY.

13. Set switches on the G & N indicator control panel as follows:

    SLAVE TELESCOPE to STAR LOS
    CONTROLLER SPEED to MED
    CONTROLLER MODE to DIRECT.

14. When VERB-NOUN display flashes, the test is complete. Press ENTER pushbutton on G & N AGC DSKY.

15. The VERB-NOUN display shall stop flashing. The VERB-NOUN display indicates

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TDRR 05368

JOB: G & N SYSTEM FINE ALIGNMENT	**JDC** 10031 (Sheet 2 of 2)

____ ____ and the AGC display indicates ____, ____, and ____ in rows 1, 2, and 3.

16. Press ENTER pushbutton on G & N AGC DSKY. The VERB-NOUN display remains the same and the AGC display indicates ____, ____, and ____ in rows 1, 2, and 3.

17. Enter (and verify) VERB _, NOUN _ into G & N AGC DSKY to stop test.

TDRR 05368

TEST DATE: **OPERATOR**	**JDC-D-**10031 **REV**
JOB: G & N SYSTEM FINE ALIGNMENT	**SHEET** 1 **OF** 1
DESCRIPTION:	**G AND N SYSTEM NO.**
	JDC REF NO. 10031 **REV**

JDC ITEM NUMBER	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
2, 3, 15, 16			ALL DISPLAYS RESPONDED AS REQUIRED.						

*To be used as required or desired

REMARKS:

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

JDC 10033 REV. A PAGE 1 OF 2
INITIAL TDRR 21539 D.S. PGS 1

JOB OPERATE POWER ON TEST

SUBSYSTEM G & N SYSTEM
ASSY.

DESCRIPTION With IMU OPERATE and AGC power applied, the CDU 1X resolver outputs and IMU DELAY circuitry is checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-14-65	22419	-	1	WK	ACM

REFERENCES Paragraphs 3-3.4.1 and 3-3.11.3.23 of ATP 1026000

IMPORTANT Performance of JDC 10007 and JDC 10009 is required before proceeding with this JDC.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000

1. Set TRANSFER switch on IMU CONTROL panel to MANUAL. Insure that the AGC MODE switch on the front of the AGC is in the OPERATE position.

2. Set switches and selectors on G & N indicator control panel as follows:
    SLAVE TELESCOPE to STAR LOS
    TRACKER POWER to OFF
    Optics Mode to ZERO OPTICS
    CONTROLLER MODE to DIRECT
    CONTROLLER SPEED to MED
    CONDITION LAMPS to ON
    POWER AND BRIGHTNESS to OFF
    ATTITUDE IMPULSE ENABLE to OFF
    IMU TEMP MODE to AUTO OVERRIDE
    PANEL BRIGHTNESS to maximum INCREASE.

3. Insure that all CDU's are set to zero. Set CHANNEL 1 switch to 2 and CHANNEL 2 and 3 switches to 1 on OSCILLOGRAPH SIGNAL SELECTOR panel. Insure that CH3AC pushbutton is lighted. Calibrate OSCILLOGRAPH channel 1, 2, and 3.

4. After at least two hours in the STANDBY mode, set CHANNEL 1, 2 and 3 switches on OSCILLOGRAPH SIGNAL SELECTOR panel to 4 and monitor the following resolver error signal outputs:
    a. Middle gimbal CDU 1X resolver at 56P9 pins 60 (high) and 43 (low) on CHANNEL 1
    b. Outer gimbal CDU 1X resolver at 56P9 pins 77 (high) and 61 (low) on CHANNEL 2
    c. Inner gimbal CDU 1X resolver at 56P9 pins 59 (high) and 41 (low) on CHANNEL 3.

5. Insure that 800 ~ 0 PH REFERENCE and

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ________

JOB OPERATE POWER ON TEST
JDC 10033 REV A PAGE 2 OF 2
SUBSYSTEM G & N SYSTEM
ASSY

CH3AC pushbuttons on OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

6. Press CHART SPEEDS 5 pushbutton on OSCILLOGRAPH CONTROL panel and set CHANNEL 1, 2, and 3 sensitivity on OSCILLOGRAPH AMPLIFIER panel to MV/MM.

7. Start OSCILLOGRAPH by setting CHART DRIVE switch to MM/SEC.

8. Press PROCEED/ISS OPERATE pushbutton on Test Control panel. The IMU DELAY lamps on the Condition Annunciator and MONITOR PANEL and the COARS ALIGN and ATT CONT (or ENTRY) MODE lamps on the IMU CONTROL panel shall light. Press EVENT MARKER on OSCILLOGRAPH CONTROL panel immediately after the IMU DELAY lamp on the MONITOR PANEL goes out. Note that the COARS ALIGN lamp goes out. Record elapsed time from OG 1X resolver initial transient to EVENT MARKER indication.

9. Press COARS ALIGN pushbutton on IMU CONTROL panel. COARS ALIGN MODE lamp on IMU CONTROL panel shall light.

10. Stop OSCILLOGRAPH and record CDU 1X resolver error outputs as indicated on OSCILLOGRAPH chart just prior to end of the time delay.

11. Press the OPTICS POWER ON pushbutton on the TEST CONTROL panel. Insure that SCT SHAFT ANGLE and TRUNNION ANGLE counters on G & N drive to 0 (± 1.0) degrees.

12. Insure that the PAVM and SCOPE "A" INPUT switches on the PRIMARY SIGNAL SELECTOR panel are set to OFF.

13. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 175 to measure 28 VDC AGC on the DVM.

14. Adjust the AGE VOLTAGE ADJUST knob on TEST CONTROL panel until the DVM indicates 28.8 (±0.25) VDC. Record indication.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

JDC NO. 10033
REV. A
INITIAL TDRR 21539

JOB OPERATE POWER ON TEST

ASSEMBLY UNDER TEST
TITLE ________
SER. NO. ________ DWG ________ REV. ____

TEST HISTORY
DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ________ SER. NO. ________ CAL DATE ________
NAME ________ SER. NO. ________ CAL DATE ________

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
8	IMU DELAY	sec	90				115		
10	Middle Gimbal CDU 1X resolver	mv	0				300		
10	Outer Gimbal CDU 1X resolver	mv	0				300		
10	Inner Gimbal CDU 1X resolver	mv	0				300		
14	28 VDC AGC	VDC	▨				▨	▨	▨
8, 9	Lamps	All lamps reacted as specified (Record all discrepancies in REMARKS portion of data sheet.)							

REMARKS:

* TO BE USED AS REQUIRED OR DESIRED

DATE ________

JOB OPERATE POWER ON TEST

JDC 10033 **REV.** B **PAGE** 1 **OF** 2

INITIAL TDRR 21539 **D.S. PGS** 1

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION With IMU OPERATE and AGC power applied, the CDU 1X resolver outputs and IMU DELAY circuitry is checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-14-65	22419	-	1	WK	ACM
B	12-21-65	24816	1,2	-	WK	

REFERENCES Paragraphs 3-3.4.1 and 3-3.11.3.23 of ATP 1026000

IMPORTANT Performance of JDC 10007 and JDC 10009 is required before proceeding with this JDC.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000

1. Set TRANSFER switch on IMU CONTROL panel to MANUAL. Insure that the AGC MODE switch on the front of the AGC is in the ON position.

2. Set switches and selectors on G & N indicator control panel as follows:

    SLAVE TELESCOPE to STAR LOS
    TRACKER POWER to OFF
    Optics Mode to ZERO OPTICS
    CONTROLLER MODE to DIRECT
    CONTROLLER SPEED to MED
    CONDITION LAMPS to ON
    POWER AND BRIGHTNESS to OFF
    ATTITUDE IMPULSE ENABLE to OFF
    IMU TEMP MODE to AUTO OVERRIDE
    PANEL BRIGHTNESS to maximum INCREASE.

3. Insure that all CDU's are set to zero. Set CHANNEL 1 switch to 2 and CHANNEL 2 and 3 switches to 1 on OSCILLOGRAPH SIGNAL SELECTOR panel. Insure that CH3AC pushbutton is lighted. Calibrate OSCILLOGRAPH channel 1, 2, and 3.

4. After at least two hours in the STANDBY mode, set CHANNEL 1, 2 and 3 switches on OSCILLOGRAPH SIGNAL SELECTOR panel to 4 and monitor the following resolver error signal outputs:

    a. Middle gimbal CDU 1X resolver at 56P9 pins 60 (high) and 43 (low) on CHANNEL 1
    b. Outer gimbal CDU 1X resolver at 56P9 pins 77 (high) and 61 (low) on CHANNEL 2
    c. Inner gimbal CDU 1X resolver at 56P9 pins 59 (high) and 41 (low) on CHANNEL 3.

5. Insure that 800 ~ 0 PH REFERENCE and

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 12 AUG 65

JOB OPERATE POWER ON TEST **JDC** 10033 **REV** B **PAGE** 2 **OF** 2

SUBSYSTEM G & N SYSTEM **ASSY**

CH3AC pushbuttons on OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

6. Press CHART SPEEDS 5 pushbutton on OSCILLOGRAPH CONTROL panel and set CHANNEL 1, 2, and 3 sensitivity on OSCILLOGRAPH AMPLIFIER panel to 50 MV/MM.

7. Start OSCILLOGRAPH by setting CHART DRIVE switch to MM/SEC.

8. Press PROCEED/ISS OPERATE pushbutton on Test Control panel. The IMU DELAY lamps on the Condition Annunciator and MONITOR PANEL and the COARS ALIGN and ATT CONT (or ENTRY) MODE lamps on the IMU CONTROL panel shall light. Press EVENT MARKER on OSCILLOGRAPH CONTROL panel immediately after the IMU DELAY lamp on the MONITOR PANEL goes out. Note that the COARS ALIGN lamp goes out. Record elapsed time from OG 1X resolver initial transient to EVENT MARKER indication.

9. Press COARS ALIGN pushbutton on IMU CONTROL panel. COARS ALIGN MODE lamp on IMU CONTROL panel shall light.

10. Stop OSCILLOGRAPH and record CDU 1X resolver error outputs as indicated on OSCILLOGRAPH chart just prior to end of the time delay.

11. Press the OPTICS POWER ON pushbutton on the TEST CONTROL panel. Insure that SCT SHAFT ANGLE and TRUNNION ANGLE counters on G & N drive to 0 (± 1.0) degrees.

12. Insure that the PAVM and SCOPE "A" INPUT switches on the PRIMARY SIGNAL SELECTOR panel are set to OFF.

13. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 175 to measure 28 VDC AGC on the DVM.

14. Adjust the AGE VOLTAGE ADJUST knob on TEST CONTROL panel until the DVM indicates 28.8 (±0.25) VDC. Record indication.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

JDC
NO. 10033
REV. B
INITIAL TDRR 21539

JOB OPERATE POWER ON TEST

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ **DWG** ____ **REV.** ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ **SER. NO.** ____ CAL DATE
NAME ____ **SER. NO.** ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION **APPROVED BY** ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
8	IMU DELAY	sec	90				115		
10	Middle Gimbal CDU 1X resolver	mv	0				300		
10	Outer Gimbal CDU 1X resolver	mv	0				300		
10	Inner Gimbal CDU 1X resolver	mv	0				300		
14	28 VDC AGC	VDC	▨				▨	▨	▨
8, 9	Lamps	All lamps reacted as specified (Record all discrepancies in REMARKS portion of data sheet.)					▨		

REMARKS:

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

JOB OPERATE POWER ON TEST

JDC 10033 REV. C PAGE 1 OF 2
INITIAL TDRR 21539 D.S. PGS 1

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION With IMU OPERATE and AGC power applied, the CDU 1X resolver outputs and IMU DELAY circuitry is checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-14-65	22419	-	1	WK	ACM
B	12-21-65	24816	1, 2	-	WK	
C	6-7-66	29394	2	-	MM	-

REFERENCES Paragraphs 3-3.4.1 and 3-3.11.3.23 of ATP 1026000

IMPORTANT Performance of JDC 10007 and JDC 10009 is required before proceeding with this JDC.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000

1. Set TRANSFER switch on IMU CONTROL panel to MANUAL. Insure that the AGC MODE switch on the front of the AGC is in the ON position.

2. Set switches and selectors on G & N indicator control panel as follows:
   - SLAVE TELESCOPE to STAR LOS
   - TRACKER POWER to OFF
   - Optics Mode to ZERO OPTICS
   - CONTROLLER MODE to DIRECT
   - CONTROLLER SPEED to MED
   - CONDITION LAMPS to ON
   - POWER AND BRIGHTNESS to OFF
   - ATTITUDE IMPULSE ENABLE to OFF
   - IMU TEMP MODE to AUTO OVERRIDE
   - PANEL BRIGHTNESS to maximum INCREASE.

3. Insure that all CDU's are set to zero. Set CHANNEL 1 switch to 2 and CHANNEL 2 and 3 switches to 1 on OSCILLOGRAPH SIGNAL SELECTOR panel. Insure that CH3AC pushbutton is lighted. Calibrate OSCILLOGRAPH channel 1, 2, and 3.

4. After at least two hours in the STANDBY mode, set CHANNEL 1, 2 and 3 switches on OSCILLOGRAPH SIGNAL SELECTOR panel to 4 and monitor the following resolver error signal outputs:

   a. Middle gimbal CDU 1X resolver at 56P9 pins 60 (high) and 43 (low) on CHANNEL 1

   b. Outer gimbal CDU 1X resolver at 56P9 pins 77 (high) and 61 (low) on CHANNEL 2

   c. Inner gimbal CDU 1X resolver at 56P9 pins 59 (high) and 41 (low) on CHANNEL 3.

5. Insure that 800 ~ 0 PH REFERENCE and

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 12 AUG 65

JOB OPERATE POWER ON TEST

JDC 10033 REV C PAGE 2 OF 2

SUBSYSTEM G & N SYSTEM

ASSY

CH3AC pushbuttons on OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

6. Press CHART SPEEDS 5 pushbutton on OSCILLOGRAPH CONTROL panel and set CHANNEL 1, 2, and 3 sensitivity on OSCILLOGRAPH AMPLIFIER panel to 50 MV/MM.

7. Start OSCILLOGRAPH by setting CHART DRIVE switch to MM/SEC.

8. Press PROCEED/ISS OPERATE pushbutton on Test Control panel. The IMU DELAY lamps on the Condition Annunciator and MONITOR PANEL and the COARS ALIGN lamps on the IMU CONTROL panel shall light during the IMU time delay. After the time delay of approximately 100 seconds, the mode selected or the mode present at the time of turnoff shall light. Press EVENT MARKER on OSCILLOGRAPH CONTROL panel immediately after the IMU DELAY lamp on the MONITOR PANEL goes out. Record elapsed time from OG 1X resolver initial transient to EVENT MARKER indication.

9. Press COARS ALIGN pushbutton on IMU CONTROL panel. COARS ALIGN MODE lamp on IMU CONTROL panel shall light.

10. Stop OSCILLOGRAPH and record CDU 1X resolver error outputs as indicated on OSCILLOGRAPH chart just prior to end of the time delay.

11. Press the OPTICS POWER ON pushbutton on the TEST CONTROL panel. Insure that SCT SHAFT ANGLE and TRUNNION ANGLE counters on G & N drive to 0 (± 1.0) degrees.

12. Insure that the PAVM and SCOPE "A" INPUT switches on the PRIMARY SIGNAL SELECTOR panel are set to OFF.

13. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 175 to measure 28 VDC AGC on the DVM.

14. Adjust the AGE VOLTAGE ADJUST knob on TEST CONTROL panel until the DVM indicates 28.8 (±0.25) VDC. Record indication.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 10033
REV. C
INITIAL TDRR 21539

JOB OPERATE POWER ON TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
8	IMU DELAY	sec	90				115		
10	Middle Gimbal CDU 1X resolver	mv	0				300		
10	Outer Gimbal CDU 1X resolver	mv	0				300		
10	Inner Gimbal CDU 1X resolver	mv	0				300		
14	28 VDC AGC	VDC	▨				▨	▨	▨
8, 9	Lamps	All lamps reacted as specified (Record all discrepancies in REMARKS portion of data sheet.)							

REMARKS:

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

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JOB OPERATE POWER ON TEST

JDC 10033 **REV.** ____ **PAGE** 1 **OF** 2

INITIAL TDRR ________ **D.S. PGS** 1

SUBSYSTEM G&N SYSTEM

ASSY.

DESCRIPTION With IMU OPERATE and AGC power applied, the CDU 1X resolver outputs and IMU DELAY circuitry is checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES Paragraphs 3-3.4.1 and 3-3.11.3.23 of ATP 1026000

IMPORTANT Performance of JDC 10007 and JDC 10009 is required before proceeding with this JDC.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000

1. Set TRANSFER switch on IMU CONTROL panel to MANUAL. Insure that the AGC MODE switch on the front of the AGC is in the OPERATE position.

2. Set switches and selectors on G&N indicator control panel as follows:
   - SLAVE TELESCOPE to STAR LOS
   - TRACKER POWER to OFF
   - Optics Mode to ZERO OPTICS
   - CONTROLLER MODE to DIRECT
   - CONTROLLER SPEED to MED
   - CONDITION LAMPS to ON
   - POWER AND BRIGHTNESS to OFF
   - ATTITUDE IMPULSE ENABLE to OFF
   - IMU TEMP MODE to AUTO OVERRIDE
   - PANEL BRIGHTNESS to maximum INCREASE.

3. Insure that all CDU's are set to zero. Set CHANNEL 1 switch to 2 and CHANNEL 2 and 3 switches to 1 on OSCILLOGRAPH SIGNAL SELECTOR panel. Insure that CH3AC pushbutton is lighted. Calibrate OSCILLOGRAPH channel 1, 2 and 3.

4. After at least two hours in the STANDBY mode, set CHANNEL 1, 2 and 3 switches on OSCILLOGRAPH SIGNAL SELECTOR panel to 4 and monitor the following resolver error signal outputs:
   a. Middle gimbal CDU 1X resolver at 56P9 pins 60 (high) and 43 (low) on CHANNEL 1

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB OPERATE POWER ON TEST **JDC** 10033 **REV** **PAGE** 2 **OF** 2

SUBSYSTEM G & N SYSTEM **ASSY**

   b. Outer gimbal CDU 1X resolver at 56P9 pins 77 (high) and 61 (low) on CHANNEL 2
   c. Inner gimbal CDU 1X resolver at 56P9 pins 59 (high) and 41 (low) on CHANNEL 3.

5. Insure that 800∿0 PH REFERENCE and CH3AC pushbuttons on OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

6. Press CHART SPEEDS 5 pushbutton on OSCILLOGRAPH CONTROL panel and set CHANNEL 1, 2, and 3 sensitivity on OSCILLOGRAPH AMPLIFIER panel to MV/MM.

7. Start OSCILLOGRAPH by setting CHART DRIVE switch to MM/ SEC.

8. Press PROCEED/ISS OPERATE pushbutton on Test Control panel. The IMU DELAY lamps on the Condition Annunciator and MONITOR PANEL and the COARS ALIGN and ATT CONT (or ENTRY) MODE lamps on the IMU CONTROL panel shall light. Press EVENT MARKER on OSCILLOGRAPH CONTROL panel immediately after the IMU DELAY lamp on the MONITOR PANEL goes out. Note that the COARS ALIGN lamp goes out. Record elapsed time from OG 1X resolver initial transient to EVENT MARKER indication.

9. Press COARS ALIGN pushbutton on IMU CONTROL panel. COARS ALIGN MODE lamp on IMU CONTROL panel shall light.

10. Stop OSCILLOGRAPH and record CDU 1X resolver error outputs as indicated on OSCILLOGRAPH chart just prior to end of the time delay.

11. Press the OPTICS POWER ON pushbutton on the TEST CONTROL panel. Insure that SCT SHAFT ANGLE and TRUNNION ANGLE counters on G & N drive to 0 (±1.0) degrees.

12. Insure that the PAVM and SCOPE "A" INPUT switches on the PRIMARY SIGNAL SELECTOR panel are set to OFF.

13. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 175 to measure 28 VDC AGC on the DVM.

14. Adjust the AGE VOLTAGE ADJUST knob on TEST CONTROL panel until the DVM indicates 28.8 (±0.25) VDC. Record indication.

DATE ______

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC
NO. 10033
REV. ______
INITIAL TDRR ______

JOB OPERATE POWER ON TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
8	IMU DELAY	sec	36				44		
10	Middle Gimbal CDU 1X resolver	mv	0				300		
10	Outer Gimbal CDU 1X resolver	mv	0				300		
10	Inner Gimbal CDU 1X resolver	mv	0				300		
14	28 VDC AGC	VDC	▨				▨	▨	▨
8, 9	Lamps	All lamps reacted as specified (Record all discrepancies in REMARKS portion of data sheet.)							

REMARKS:

* TO BE USED AS REQUIRED OR DESIRED

DATE ______

JOB AGC OPERATIONAL TEST | JDC 10039 REV. A PAGE 1 OF 9

INITIAL TDRR 21539 D.S. PGS 2

SUBSYSTEM G & N SYSTEM | ASSY

DESCRIPTION The MAIN PANEL and G & N AGC DSKY alarm displays and alarm circuitry, are verified through routines entered through both DSKY's. The AGC INSTRUCTION words and control pulses are verified as well as AGC-S/C and telemetry interface. All DSKY functions are verified and the ability of the AGC to accept data loaded through the DSKY is checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	11-30-65	24451	All	All	WK	TM

REFERENCES Paragraph 3-3.3 of ATP 1026000

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. This JDC utilizes the CTS. See JDC's 10002 and 10004 for cable interconnection and JDC 10007 for CTS switch initialization and turn-on procedure.

NOTE: Insure that DOWNLINK switch on SYSTEM INTERFACE panel is set to DL2 and DOWNLINK ENABLE switch is not lighted.

1. Insure that TRANSFER switch on IMU CONTROL panel is set to MANUAL and COARS ALIGN pushbutton is lighted.

2. Enter (and verify) VERB 05, NOUN 05 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 05-05.

3. Enter (and verify) VERB 50, NOUN 50 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 50-50.

4. Repeat steps 2 and 3 using the MAIN PANEL DSKY.

5. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Ignore all alarm indications.

6. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. The MP and G & N AGC DSKY displays shall be blank, except for 00 in the PROGRAM DISPLAY lamps.

7. Enter (and verify) VERB 25, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 25-02 (flashing).

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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8. Enter address 01775_8 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 21-02 (flashing) and row 3 shall indicate 01775.

9. Enter +88888 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 22-02 (flashing) and row 1 shall indicate +88888.

10. Enter +88888 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 23-02 (flashing) and row 2 shall indicate +88888.

11. Enter +88888 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 23-02 (flashing) and row 3 shall indicate +88888.

12. Vary BRIGHTNESS CONTROL on MAIN PANEL and G & N AGC DSKY to both limit positions. All AGC DSKY displays shall vary in brightness from off to bright.

13. Press CLEAR pushbuttons on G & N AGC DSKY three times. All rows of the MAIN PANEL and G & N AGC DSKY shall be blank.

14. Repeat steps 7 through 11 and step 13 using the MAIN PANEL DSKY.

15. Enter (and verify) VERB 25, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

16. Enter address 01775_8 into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter +00123 into G & N AGC DSKY, press ENTER pushbutton: enter -00456, press ENTER pushbutton: and enter -00789, press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY shall indicate +00123, -00456, and -00789 in rows 1, 2 and 3 respectively.

18. Enter (and verify) VERB 05, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01775_8 and press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY shall indicate 00173, 77067, and 76352 in rows 1, 2 and 3 respectively.

19. Repeat steps 15 through 18 using the MAIN PANEL DSKY.

20. Enter (and verify) VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

21. Enter (and verify) 01762_8 into G & N AGC DSKY. Press ENTER pushbutton.

22. Enter (and verify) 00000 into G & N AGC DSKY. Press ENTER pushbutton.

23. Enter (and verify) VERB 21, NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton.

24. Enter (and verify) 02000_8 into G & N AGC DSKY. Press ENTER pushbutton.

25. Enter (and verify) VERB 20, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

26. Enter (and verify) address 14422_8 into G & N AGC DSKY. Press ENTER pushbutton. The ACTIVITY COMP lamp on the G & N AGC DSKY and MP DSKY and the T AGC ACT lamp on the System Interface panel shall be lit for approximately 20 seconds.

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27. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

28. Enter address 00011_8 into G & N AGC DSKY, press ENTER pushbutton: enter 00025_8, press ENTER pushbutton. The PROGRAM ALARM, CHECK FAIL and KEY RELEASE lamps on the G & N AGC DSKY and COMP FAIL and KEY RELEASE on MP DSKY shall light.

29. Press TEST ALARM pushbutton on G & N AGC DSKY. The RUPTLOCK, PARITY FAIL, TC TRAP, and COUNTER FAIL lamps on the G & N AGC DSKY shall light.

30. Observe the SYSTEM INTERFACE panel of CTS and verify that the following lamps have lighted.

a. T PROG CH
b. T PROG AL
c. T KEY REL
d. T RUPT AL
e. T PAR F
f. T TC TRAP
g. T CNT F

31. Press ERROR RESET pushbutton on MAIN PANEL DSKY. All lamps shall go out except KEY RELEASE on G & N AGC DSKY and KEY RELEASE on MP DSKY.

32. Enter (and verify) VERB 35 into G & N AGC DSKY. Press ENTER pushbutton. KEY RELEASE lamp on G & N AGC DSKY and MP DSKY shall go out.

33. Enter BERB 36 into G & N AGC DSKY. Press ENTER pushbutton.

34. Enter (and verify) VERB 16, NOUN 65 into G & N AGC DSKY. Press ENTER pushbutton.

35. Observe that the number displayed in R2 of the DSKY is changing. Disregard R1 display.

36. Enter VERB 31, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

37. Enter 77777_8 into G & N AGC DSKY. Press ENTER pushbutton. The PARITY FAIL lamp shall light.

38. Press ERROR RESET pushbutton.

39. Enter VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

40. Enter 01700_8 into G & N AGC DSKY. Press ENTER pushbutton.

41. Repeat step 40.

42. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 04000_8 and press ENTER pushbutton.

43. Enter VERB 20 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

44. Enter 01700_8 into G & N AGC DSKY. Press ENTER pushbutton. The TC TRAP lamp shall light on the G & N AGC DSKY.

45. Press ERROR RESET pushbutton.

46. Enter VERB 24, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700_8 and press ENTER pushbutton.

47. Enter 20017 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700 and press ENTER pushbutton.

48. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 04000_8 and press ENTER pushbutton.

49. Enter VERB 20 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700_8 and press ENTER pushbutton. The RUPT LOCK lamp shall light on G & N AGC DSKY. Press ERROR RESET pushbutton.

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50. Press SCOPE PROBES 1:1 to light pushbutton and set CHANNEL A-B SELECT to CHAN B DIFF and CHANNEL B selectors to 200 and 20 on SYSTEM INTERFACE panel of CTS.

51. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

52. Enter address 00011_8 into G & N AGC DSKY. Press ENTER pushbutton.

53. Enter data 10000_8 into G & N AGC DSKY. Press ENTER pushbutton.

54. Set COUNTER switch on SYSTEM INTERFACE panel of CTS to CHAN A and CHAN B and FREQUENCY COUNTER CONTROL as follows:

FUNCTION to FREQ A
FREQ-TIME to KC

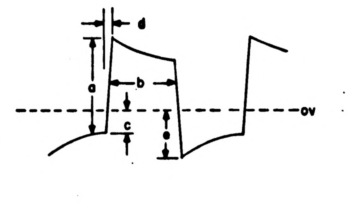
55. Measure and record the frequency. Set the COUNTER switch on SYSTEM INTERFACE panel to OFF.

56. On the OSCILLOSCOPE set the MODE switch to A+B, the Channel A switch to NORM D. C. and the Channel B switch to INVERT D. C. and synchronize the trace on the OSCILLOSCOPE.

57. Measure the following characteristics:

a. Positive Amplitude. (Neglect overshoot)
b. Pulse Width at 50% Amplitude.
c. Zero Shift.
d. Rise Time at 10-90%.
e. Negative Amplitude (as referenced to 0 VDC).

Record 1/2 (a) in MAX VALUE column of item 57 (c) on Data Sheet.



NOTE: Insure UPTEL switch is set to BLOCK.

58. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

59. Enter (and verify) address 01273 into G & N AGC DSKY. Press ENTER pushbutton.

60. Enter (and verify) 25252 into G & N AGC DSKY. Press ENTER pushbutton.

61. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.

62. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS
25252	1274
25252	1275
25252	1276
25252	1277
25252	1300
25252	1301
25252	1302
25252	1303
25252	1304
25252	1305
25252	1306

63. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

64. Enter (and verify) address 01327 into G & N AGC DSKY. Press ENTER pushbutton.

65. Enter (and verify) 25252 into G & N AGC DSKY. Press ENTER pushbutton.

66. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.

67. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS
25252	01330
25252	01331
25252	01332
25252	01333
25252	01334
25252	01335
25252	01336
25252	01337
25252	01340
25252	01341
25252	01342

68. Enter (and verify) VERB 25 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

69. Enter (and verify) address 00720 into G & N AGC DSKY. Press ENTER pushbutton.

70. Enter (and verify) data 25252 into G & N AGC DSKY three times. Press ENTER pushbutton after each entry. Enter VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 00011 and press ENTER pushbutton. Enter 10000 and press ENTER pushbutton.

71. Set AGC X FORMER switch to LOW ONE 2, DOWNLINK switch to DL1, press DOWNLINK ENABLE SW to light pushbutton, and press RESET pushbutton. Press ERROR RESET pushbutton on G & N AGC DSKY. TL FAIL, and T TEL AL lights shall go out.

72. Set CHANNEL A-B SELECT to CHAN A DIFF, CHANNEL A selectors to 100 and 2, and CHANNEL B selectors to 100 and 1.

73. Synchronize OSCILLOSCOPE waveform and measure the following pulse characteristics:

a. Amplitude (A)
b. Width at A/2
c. Droop at 2.0 μ sec
d. Rise Time at 10-90% A

74. Set CHANNEL A-B SELECT switch to A-B, CHANNEL A selectors to 300 and 7, and CHANNEL B selectors to 100 and 2.

75. Set the MODE switch on OSCILLOSCOPE to ALT and Channel B to NORM DC.

76. Adjust both traces on the OSCILLOSCOPE and measure and record the delay between the leading edge of CHANNEL A and the leading edge of CHANNEL B traces.

77. Set CHANNEL A-B SELECT to CHAN B DIFF, and CHANNEL A selectors to 100 and 1. Set the EXT SYNC switch of the SYSTEM INTERFACE PANEL to SY-1 position and the triggering SOURCE switch of the OSCILLOSCOPE to EXT position.

78. Set the MODE switch on the OSCILLOSCOPE to A & B, Channel A switch to NORM DC, and the Channel B switch to INVERT DC. Synchronize trace. Establish the mean amplitude of the pulse as "0" vdc on a grid reference line of OSCILLOSCOPE.

79. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

80. Enter address 00011_8 into G & N AGC DSKY. Press ENTER pushbutton.

81. Enter data 00000 into G & N AGC DSKY. Press ENTER pushbutton. The TL FAIL lamp on the G & N AGC DSKY and the T TEL AL lamp on the SYSTEM INTERFACE panel shall light. The PGNScondition lamp shall light.

82. Measure and record the peak position and negative no pulse noise level with respect to the "0" vdc reference established in step 100 on the OSCILLOSCOPE.

83. Set CHANNEL B selectors to 200 and 20. Measure and record the peak to peak noise level on the OSCILLOSCOPE.

84. Set the AGC X FORMER switch to NORMAL, DOWNLINK switch to DL2 position and press DOWNLINK ENABLE SW to extinguish pushbutton light. Press ERROR RESET pushbutton. All lamps that lighted in Step 103 shall go out.

85. Insure that TEST MODE switch on the Programmer and Monitor Panel of CTS is set to SYSTEM and that TIMING INHIBIT switch on Logic #2 Drawer is set to OFF.

NOTE: If pre-punched test tape is available, disregard steps 86, 87, 88 and 89 and proceed directly to step 90.

86. Press TAPE PREPARE mode control switch on the Programmer and Monitor Panel.

87. Set PUNCH switch to ON.

88. Using the "0" and "1" keys on the Programmer and Monitor panel octal keyboard, make a tape by punching the following "0" and "1" groups from left to right from the following table. Provide spacing between the alphabetical rows on the tape by pressing the BUZZ button on the tape punch. This tape should be prepared very carefully to insure a successful test.

a.	110	001	011	101	0001
b.	100	010	111	010	0010
c.	100	001	111	100	0001
d.	111	111	000	001	1111
e.	110	000	011	111	0000
f.	100	010	111	010	0010
g.	111	100	000	111	1100
h.	110	000	011	111	0000
i.	100	001	111	100	0001
j.	100	111	110	000	0111
k.	110	000	011	111	0000
l.	110	000	011	111	0000
m.	111	100	000	111	1100
n.	110	000	011	111	0000
o.	100	001	111	100	0001
p.	100	010	111	010	0010
q.	100	011	111	000	0011
r.	100	100	110	110	0100
s.	111	100	000	111	1100

Press STOP CODE button.

89. Set PUNCH switch to OFF and remove tape.

90. Put tape into TAPE READER.

91. Set READER switch to ON.

92. Press TAPE-UPLINK mode control switch.

93. Set TAPE FREERUN/STEP switch to FREERUN.

94. Set UPTEL switch on MP DSKY to ACCEPT. The ACC UPL lamp on SYSTEM INTERFACE panel shall light. Enter VERB 36 into MP DSKY. Press ENTER pushbutton.

95. Press EXECUTE pushbutton on Programmer and Monitor panel.

96. After tape is finished, set READER switch to OFF.

97. Enter (and verify) VERB 01, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

98. Enter address 01700_8 into G & N AGC DSKY. Press ENTER pushbutton.

99. The G & N AGC DSKY shall display 01234 in register R1.

100. Enter VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

101. Enter address 01700_8 into G & N AGC DSKY. Press ENTER pushbutton. Enter (and verify) 00000 into G & N AGC DSKY. Press ENTER pushbutton.

102. Set UPTEL switch on MP DSKY to BLOCK. The ACC UPL lamp on SYSTEM INTERFACE panel shall go out.

103. Rewind tape and put tape into TAPE READER.

104. Repeat steps 91, 92, and 95 through 98.

105. The G & N AGC DSKY shall display 00000 in register R1.

106. Press KEY RELEASE pushbutton. The UPTL light shall go off.

107. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

108. Enter (and verify) address 00745_8 into G & N AGC DSKY. Press ENTER pushbutton.

109. Enter (and verify) data 43777_8 into G & N AGC DSKY. Press ENTER pushbutton. The following lamps on the SYSTEM INTERFACE panel shall light.

a. G/N Δ V
b. CM/SM SEP
c. G.M.P.C.
d. G/N ATT
e. X TRANS
f. G/N ENTRY
g. AUTO .05G
h. TELECOM
i. C33
j. G/N FAIL
k. FDAI-A

110. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

111. Enter (and verify) address 00745_8 into G & N AGC DSKY. Press ENTER pushbutton.

112. Enter (and verify) data 40000 into G & N AGC DSKY. Press ENTER pushbutton. All lamps shall extinguish that were lighted in step 109.

113. Press DSKY RELAY RETURNS #1 pushbutton. All lamps listed in step 109 shall light on SYSTEM INTERFACE panel. Release pushbutton, all of above lamps shall go out.

114. Press DSKY RELAY RETURNS #2 pushbuttons on SYSTEM INTERFACE panel. All 14 lamps prefixed with T shall light and shall go out when pushbutton is released.

115. Press and light each of following pushbuttons on SYSTEM INTERFACE panel of CTS: (Ignore Program Alarm if it occurs in this step.)

a. IN2-5 LIFT OFF
b. IN2-6 GUIDANCE RELEASE
c. IN2-7 SATURN ULLAGE
d. IN2-8 S IV B SEPARATE
e. IN2-9 SM/CM SEPARATE
f. IN2-13 SCS ΔV MODE
g. IN2-14 G/N MON MODE
h. INO-11 G/N ATT CONT MODE
i. INO-12 G/N ΔV MODE
j. INO-13 G/N ENTRY MODE

116. Enter (and verify) VERB 01 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

117. Enter (and verify) address 00004 into G & N AGC DSKY. Press ENTER pushbutton. R_1 shall indicate 16XXX.

118. Press ENTER pushbutton on G & N AGC DSKY. Enter (and verify) 00006 into G & N AGC DSKY. Press ENTER pushbutton. R_1 shall indicate 3X76X or 3X77X.

119. Press all pushbuttons listed in step 115 to insure pushbutton lights go out.

120. Set the AGC Voltage Control 3V and 13V controls on the CTS POWER CONTROL panel to midrange and set the 3V and 13V switches to ON.

121. Set the VOLTAGE SELECT switch to AGC 3V and adjust 3V control for a voltmeter reading of 3.0 (±0.1) VDC. (If control does not vary voltage, set 3V switch to OFF, turn voltage control fully counterclockwise and back to midrange, set 3V switch to ON, and then adjust.) Set VOLTAGE SELECT switch to AGC 13V and adjust 13V control for a voltmeter reading of 13.0 (±0.5) VDC.

122. Press ERROR RESET. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter (and verify) VERB 21, NOUN 27, into G & N AGC DSKY. Press ENTER pushbutton.

123. Enter (and verify) 70000 into G & N AGC DSKY. Press ENTER pushbutton.

124. Set STRT 1 and 2 switches on BUFFER Circuit Assembly to OFF.

125. Set the VOLTAGE SELECT switch to AGC 13V and using 13V control, slowly increase the voltage (not higher than 16 VDC) until an AGC fail or alarm occurs other than PWR FAIL. Record following voltages: (a) when PWR FAIL occurs and (b) when other alarm or fail occurs (it it does occur). If alarm or fail does not occur record "none"

on data sheet. Press ERROR RESET pushbutton. Repeat steps 121, 122 and 123.

126. Lower the voltage using procedure of step 125 (r lower limit). Record following voltage: (a) when PWR FAIL occurs and (b) when other AGC alarms or fails occurs. Press ERROR RESET pushbutton. Repeat steps 121, 122 and 123.

127. Set the VOLTAGE SELECT switch to AGC 3V position and using 3V control, slowly decrease the voltage (not lower than 2VDC) until an AGC fail or alarm occurs other than the PWR FAIL. (Obtain control as stated in step 121.) Record following voltages: (a) when PWR FAIL occurs, and (b) when other alarm or fail occurs (if it does occur). If alarm or fail does not occur record "none" on data sheet. Repeat steps 121, 122 and 123.

128. Increase the voltage using procedure of step 127 (until control is lost, but not higher than 3.5 VDC). Record following voltage: (a) when PWR FAIL occurs and (b) when other AGC alarms or fails occur. If alarm or fail does not occur record "none" on data sheet. Press ERROR RESET pushbutton.

129. Using 3V control, adjust until voltmeter indicated 3.0 (±0.1) VDC. (Obtain control as stated in step 121.)

130. Set 3V and 13V switches on POWER CONTROL panel to OFF and STRT 1 and 2 switches on BUFFER Circuit Assembly to ON.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

JDC
NO. 10039
REV. A
INITIAL TDRR 21539

JOB AGC OPERATIONAL TEST

ASSEMBLY UNDER TEST

TITLE
SER. NO. DWG REV.

TEST HISTORY

DATE START END SITE / LOCATION
TIME START END TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME SER. NO. CAL DATE
NAME SER. NO. CAL DATE

CONDUCTED BY (NAME/AFFILIATION) APPROVED BY (NAME/AFFILIATION)

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES 1st	2nd*	3rd*	MAX VALUE	REJ	ACC
55	Frequency	KC	102.3				102.5		
57a	Positive Amplitude	V P-P	5				9		
57b	Pulse Width	μ sec	2.5				3.5		
57c	Zero Shift	V P-P							
57d	Rise Time	μ sec	0				0.2		
57e	Negative Amplitude	V P-P	0				8.5		
73a	Amplitude	V P-P	5				9		
73b	Pulse Width	μ sec	2				6		
73c	Droop	V P-P	0				1.4		
73d	Rise Time	μ sec	0				0.2		
76	Pulse delay	μ sec	0				1		
82	DLNK Data, No Pulse Noise, Pos	V Peak	0				+0.4		
	DLNK Data, No. Pulse Noise, Neg	V Peak	0				-6.0		
83	Eng. On, No Pulse Noise	V P-P	0				0.4		

*** TO BE USED AS REQUIRED OR DESIRED**

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 10039
REV. A

JOB AGC OPERATIONAL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES 1st	2nd*	3rd*	MAX VALUE	REJ	ACC
2 thru 14 16 thru 19 26, 28 thru 32, 35, 44, 49, 81, 84, 94, 102, 106, 109, 112, 113, 114, 117	AGC DISPLAYS	All displays responded as required (Record all discrepancies in REMARKS portion of data sheet.)							
125(a)	13 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
(b)	13 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
126(a)	13 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
(b)	13 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
127(a)	3 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
(b)	3 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
128(a)	3 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
(b)	3 Volt Hi Voltage	Volts dc	▨				▨	▨	▨

*** TO BE USED AS REQUIRED OR DESIRED**

REMARKS:

DATE 12 AUG 65

JOB AGC OPERATIONAL TEST | JDC 10039 REV. B PAGE 1 OF 9

INITIAL TDRR 21539 D.S. PGS 2

SUBSYSTEM G & N SYSTEM | ASSY

DESCRIPTION The MAIN PANEL and G & N AGC DSKY alarm displays and alarm circuitry, are verified through routines entered through both DSKY's. The AGC INSTRUCTION words and control pulses are verified as well as AGC-S/C and telemetry interface. All DSKY functions are verified and the ability of the AGC to accept data loaded through the DSKY is checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	11-30-65	24451	All	All	WK	TM
B	3-8-66	26921	3,6,8		WK	ACM

REFERENCES Paragraph 3-3.3 of ATP 1026000

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. This JDC utilizes the CTS. See JDC's 10002 and 10004 for cable interconnection and JDC 10007 for CTS switch initialization and turn-on procedure.

NOTE: Insure that DOWNLINK switch on SYSTEM INTERFACE panel is set to DL2 and DOWNLINK ENABLE switch is not lighted.

1. Insure that TRANSFER switch on IMU CONTROL panel is set to MANUAL and COARS ALIGN pushbutton is lighted.

2. Enter (and verify) VERB 05, NOUN 05 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 05-05.

3. Enter (and verify) VERB 50, NOUN 50 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 50-50.

4. Repeat steps 2 and 3 using the MAIN PANEL DSKY.

5. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Ignore all alarm indications.

6. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. The MP and G & N AGC DSKY displays shall be blank, except for 00 in the PROGRAM DISPLAY lamps.

7. Enter (and verify) VERB 25, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 25-02 (flashing).

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8. Enter address 01775_8 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 21-02 (flashing) and row 3 shall indicate 01775.

9. Enter +88888 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 22-02 (flashing) and row 1 shall indicate +88888.

10. Enter +88888 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 23-02 (flashing) and row 2 shall indicate +88888.

11. Enter +88888 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 23-02 (flashing) and row 3 shall indicate +88888.

12. Vary BRIGHTNESS CONTROL on MAIN PANEL and G & N AGC DSKY to both limit positions. All AGC DSKY displays shall vary in brightness from off to bright.

13. Press CLEAR pushbuttons on G & N AGC DSKY three times. All rows of the MAIN PANEL and G & N AGC DSKY shall be blank.

14. Repeat steps 7 through 11 and step 13 using the MAIN PANEL DSKY.

15. Enter (and verify) VERB 25, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

16. Enter address 01775_8 into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter +00123 into G & N AGC DSKY, press ENTER pushbutton: enter -00456, press ENTER pushbutton: and enter -00789, press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY shall indicate +00123, -00456, and -00789 in rows 1, 2 and 3 respectively.

18. Enter (and verify) VERB 05, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01775_8 and press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY shall indicate 00173, 77067, and 76352 in rows 1, 2 and 3 respectively.

19. Repeat steps 15 through 18 using the MAIN PANEL DSKY.

20. Enter (and verify) VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

21. Enter (and verify) 01762_8 into G & N AGC DSKY. Press ENTER pushbutton.

22. Enter (and verify) 00000 into G & N AGC DSKY. Press ENTER pushbutton.

23. Enter (and verify) VERB 21, NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton.

24. Enter (and verify) 02000_8 into G & N AGC DSKY. Press ENTER pushbutton.

25. Enter (and verify) VERB 20, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

26. Enter (and verify) address 14422_8 into G & N AGC DSKY. Press ENTER pushbutton. The ACTIVITY COMP lamp on the G & N AGC DSKY and MP DSKY and the T AGC ACT lamp on the System Interface panel shall be lit for approximately 20 seconds.

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27. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

28. Enter address 00011_8 into G & N AGC DSKY, press ENTER pushbutton: enter 00025_8, press ENTER pushbutton. The PROGRAM ALARM, CHECK FAIL and KEY RELEASE lamps on the G & N AGC DSKY and COMP FAIL and KEY RELEASE on MP DSKY shall light.

29. Press TEST ALARM pushbutton on G & N AGC DSKY. The RUPTLOCK, PARITY FAIL, TC TRAP, and COUNTER FAIL lamps on the G & N AGC DSKY shall light.

30. Observe the SYSTEM INTERFACE panel of CTS and verify that the following lamps have lighted.

a. T PROG CH
b. T PROG AL
c. T KEY REL
d. T RUPT AL
e. T PAR F
f. T TC TRAP
g. T CNT F

31. Press ERROR RESET pushbutton on MAIN PANEL DSKY. All lamps shall go out except KEY RELEASE on G & N AGC DSKY and KEY RELEASE on MP DSKY.

32. Enter (and verify) VERB 35 into G & N AGC DSKY. Press ENTER pushbutton. KEY RELEASE lamp on G & N AGC DSKY and MP DSKY shall go out.

33. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton.

34. Enter (and verify) VERB 16, NOUN 65 into G & N AGC DSKY. Press ENTER pushbutton.

35. Observe that the number displayed in R2 of the DSKY is changing. Disregard R1 display.

36. Enter VERB 31, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

37. Enter 77777_8 into G & N AGC DSKY. Press ENTER pushbutton. The PARITY FAIL lamp shall light.

38. Press ERROR RESET pushbutton.

39. Enter VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

40. Enter 01700_8 into G & N AGC DSKY. Press ENTER pushbutton.

41. Repeat step 40.

42. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 04000_8 and press ENTER pushbutton.

43. Enter VERB 20 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

44. Enter 01700_8 into G & N AGC DSKY. Press ENTER pushbutton. The TC TRAP lamp shall light on the G & N AGC DSKY.

45. Press ERROR RESET pushbutton.

46. Enter VERB 24, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700_8 and press ENTER pushbutton.

47. Enter 20017 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700 and press ENTER pushbutton.

48. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 04000_8 and press ENTER pushbutton.

49. Enter VERB 20 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

Enter 01700_8 and press ENTER pushbutton. The RUPT LOCK lamp shall light on G & N AGC DSKY. Press ERROR RESET pushbutton.

50. Press SCOPE PROBES 1:1 to light pushbutton and set CHANNEL A-B SELECT to CHAN B DIFF and CHANNEL B selectors to 200 and 20 on SYSTEM INTERFACE panel of CTS.

51. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

52. Enter address 00011_8 into G & N AGC DSKY. Press ENTER pushbutton.

53. Enter data 10000_8 into G & N AGC DSKY. Press ENTER pushbutton.

54. Set COUNTER switch on SYSTEM INTERFACE panel of CTS to CHAN A and CHAN B and FREQUENCY COUNTER CONTROL as follows:

FUNCTION to FREQ A
FREQ-TIME to KC

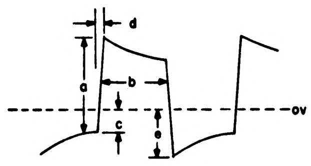
55. Measure and record the frequency. Set the COUNTER switch on SYSTEM INTERFACE panel to OFF.

56. On the OSCILLOSCOPE set the MODE switch to A+B, the Channel A switch to NORM D. C. and the Channel B switch to INVERT D. C. and synchronize the trace on the OSCILLOSCOPE.

57. Measure the following characteristics:

a. Positive Amplitude. (Neglect overshoot)
b. Pulse Width at 50% Amplitude.
c. Zero Shift.
d. Rise Time at 10-90%.
e. Negative Amplitude (as referenced to 0 VDC).

Record 1/2 (a) in MAX VALUE column of item 57 (c) on Data Sheet.



NOTE: Insure UPTEL switch is set to BLOCK.

58. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

59. Enter (and verify) address 01273 into G & N AGC DSKY. Press ENTER pushbutton.

60. Enter (and verify) 25252 into G & N AGC DSKY. Press ENTER pushbutton.

61. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.

62. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS
25252	1274
25252	1275
25252	1276
25252	1277
25252	1300
25252	1301
25252	1302
25252	1303
25252	1304
25252	1305
25252	1306

63. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

64. Enter (and verify) address 01327 into G & N AGC DSKY. Press ENTER pushbutton.

65. Enter (and verify) 25252 into G & N AGC DSKY. Press ENTER pushbutton.

66. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.

67. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS
25252	01330
25252	01331
25252	01332
25252	01333
25252	01334
25252	01335
25252	01336
25252	01337
25252	01340
25252	01341
25252	01342

68. Enter (and verify) VERB 25 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

69. Enter (and verify) address 00720 into G & N AGC DSKY. Press ENTER pushbutton.

70. Enter (and verify) data 25252 into G & N AGC DSKY three times. Press ENTER pushbutton after each entry. Enter VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 00011 and press ENTER pushbutton. Enter 10000 and press ENTER pushbutton.

71. Set AGC X FORMER switch to LOW ONE 2, DOWNLINK switch to DL1, press DOWNLINK ENABLE SW to light pushbutton, and press RESET pushbutton. Press ERROR RESET pushbutton on G & N AGC DSKY. TL FAIL, and T TEL AL lights shall go out.

72. Set CHANNEL A-B SELECT to CHAN A DIFF, CHANNEL A selectors to 100 and 2, and CHANNEL B selectors to 100 and 1.

73. Synchronize OSCILLOSCOPE waveform and measure the following pulse characteristics:

a. Amplitude (A)
b. Width at A/2
c. Droop at 2.0 μ sec
d. Rise Time at 10-90% A

74. Set CHANNEL A-B SELECT switch to A-B, CHANNEL A selectors to 300 and 7, and CHANNEL B selectors to 100 and 2.

75. Set the MODE switch on OSCILLOSCOPE to ALT and Channel B to NORM DC.

76. Adjust both traces on the OSCILLOSCOPE and measure and record the delay between the leading edge of CHANNEL A and the leading edge of CHANNEL B traces.

77. Set CHANNEL A-B SELECT to CHAN B DIFF, and CHANNEL A selectors to 100 and 1. Set the EXT SYNC switch of the SYSTEM INTERFACE PANEL to SY-1 position and the triggering SOURCE switch of the OSCILLOSCOPE to EXT position.

78. Set the MODE switch on the OSCILLOSCOPE to A & B, Channel A switch to NORM DC, and the Channel B switch to INVERT DC. Synchronize trace. Establish the mean amplitude of the pulse as "0" vdc on a grid reference line of OSCILLOSCOPE.

79. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

80. Enter address 00011_8 into G & N AGC DSKY. Press ENTER pushbutton.

81. Enter data 00000 into G & N AGC DSKY. Press ENTER pushbutton. The TL FAIL lamp on the G & N AGC DSKY and the T TEL AL lamp on the SYSTEM INTERFACE panel shall light. The PGNScondition lamp shall light.

82. Measure and record the peak position and negative no pulse noise level with respect to the "0" vdc reference established in step 78 on the OSCILLOSCOPE.

83. Set CHANNEL B selectors to 200 and 20. Measure and record the peak to peak noise level on the OSCILLOSCOPE.

84. Set the AGC X FORMER switch to NORMAL, DOWNLINK switch to DL2 position and press DOWNLINK ENABLE SW to extinguish pushbutton light. Press ERROR RESET pushbutton. All lamps that lighted in Step 81 shall go out.

85. Insure that TEST MODE switch on the Programmer and Monitor Panel of CTS is set to SYSTEM and that TIMING INHIBIT switch on Logic #2 Drawer is set to DOWN.

NOTE: If pre-punched test tape is available, disregard steps 86, 87, 88 and 89 and proceed directly to step 90.

86. Press TAPE PREPARE mode control switch on the Programmer and Monitor Panel.

87. Set PUNCH switch to ON.

88. Using the "0" and "1" keys on the Programmer and Monitor panel octal keyboard, make a tape by punching the following "0" and "1" groups from left to right from the following table. Provide spacing between the alphabetical rows on the tape by pressing the BUZZ button on the tape punch. This tape should be prepared very carefully to insure a successful test.

a.	110	001	011	101	0001
b.	100	010	111	010	0010
c.	100	001	111	100	0001
d.	111	111	000	001	1111
e.	110	000	011	111	0000
f.	100	010	111	010	0010
g.	111	100	000	111	1100
h.	110	000	011	111	0000
i.	100	001	111	100	0001
j.	100	111	110	000	0111
k.	110	000	011	111	0000
l.	110	000	011	111	0000
m.	111	100	000	111	1100
n.	110	000	011	111	0000

o.	100	001	111	100	0001
p.	100	010	111	010	0010
q.	100	011	111	000	0011
r.	100	100	110	110	0100
s.	111	100	000	111	1100

Press STOP CODE button.

89. Set PUNCH switch to OFF and remove tape.

90. Put tape into TAPE READER.

91. Set READER switch to ON.

92. Press TAPE-UPLINK mode control switch.

93. Set TAPE FREERUN/STEP switch to FREERUN.

94. Set UPTEL switch on MP DSKY to ACCEPT. The ACC UPL lamp on SYSTEM INTERFACE panel shall light. Enter VERB 36 into MP DSKY. Press ENTER pushbutton.

95. Press EXECUTE pushbutton on Programmer and Monitor panel.

96. After tape is finished, set READER switch to OFF.

97. Enter (and verify) VERB 01, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

98. Enter address 01700_8 into G & N AGC DSKY. Press ENTER pushbutton.

99. The G & N AGC DSKY shall display 01234 in register R1.

100. Enter VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

101. Enter address 01700_8 into G & N AGC DSKY. Press ENTER pushbutton. Enter (and verify) 00000 into G & N AGC DSKY. Press ENTER pushbutton.

102. Set UPTEL switch on MP DSKY to BLOCK. The ACC UPL lamp on SYSTEM INTERFACE panel shall go out.

103. Rewind tape and put tape into TAPE READER.

104. Repeat steps 91, 92, and 95 through 98.

105. The G & N AGC DSKY shall display 00000 in register R1.

106. Press KEY RELEASE pushbutton. The UPTL light shall go off.

107. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

108. Enter (and verify) address 00745_8 into G & N AGC DSKY. Press ENTER pushbutton.

109. Enter (and verify) data 43777_8 into G & N AGC DSKY. Press ENTER pushbutton. The following lamps on the SYSTEM INTERFACE panel shall light.

a. G/N Δ V
b. CM/SM SEP
c. G.M.P.C.
d. G/N ATT
e. X TRANS
f. G/N ENTRY
g. AUTO .05G
h. TELECOM
i. C33
j. G/N FAIL
k. FDAI-A

110. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

111. Enter (and verify) address 00745_8 into G & N AGC DSKY. Press ENTER pushbutton.

112. Enter (and verify) data 40000 into G & N AGC DSKY. Press ENTER pushbutton. All lamps shall extinguish that were lighted in step 109.

113. Press DSKY RELAY RETURNS #1 pushbutton. All lamps listed in step 109 shall light on SYSTEM INTERFACE panel. Release pushbutton, all of above lamps shall go out.

114. Press DSKY RELAY RETURNS #2 pushbuttons on SYSTEM INTERFACE panel. All 14 lamps prefixed with T shall light and shall go out when pushbutton is released.

115. Press and light each of following pushbuttons on SYSTEM INTERFACE panel of CTS: (Ignore Program Alarm if it occurs in this step.)

a. IN2-5 LIFT OFF
b. IN2-6 GUIDANCE RELEASE
c. IN2-7 SATURN ULLAGE
d. IN2-8 S IV B SEPARATE
e. IN2-9 SM/CM SEPARATE
f. IN2-13 SCS ΔV MODE
g. IN2-14 G/N MON MODE
h. INO-11 G/N ATT CONT MODE
i. INO-12 G/N ΔV MODE
j. INO-13 G/N ENTRY MODE

116. Enter (and verify) VERB 01 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

117. Enter (and verify) address 00004 into G & N AGC DSKY. Press ENTER pushbutton. R_1 shall indicate 16XXX.

118. Press ENTER pushbutton on G & N AGC DSKY. Enter (and verify) 00006 into G & N AGC DSKY. Press ENTER pushbutton. R_1 shall indicate 3X76X or 3X77X.

119. Press all pushbuttons listed in step 115 to insure pushbutton lights go out.

120. Set the AGC Voltage Control 3V and 13V controls on the CTS POWER CONTROL panel to midrange and set the 3V and 13V switches to ON.

121. Set the VOLTAGE SELECT switch to AGC 3V and adjust 3V control for a voltmeter reading of 3.0 (±0.1) VDC. (If control does not vary voltage, set 3V switch to OFF, turn voltage control fully counterclockwise and back to midrange, set 3V switch to ON, and then adjust.) Set VOLTAGE SELECT switch to AGC 13V and adjust 13V control for a voltmeter reading of 13.0 (±0.5) VDC.

122. Press ERROR RESET. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter (and verify) VERB 21, NOUN 27, into G & N AGC DSKY. Press ENTER pushbutton.

123. Enter (and verify) 70000 into G & N AGC DSKY. Press ENTER pushbutton.

124. Set STRT 1 and 2 switches, on BUFFER Circuit Assembly, to OFF and ALGA switch to ON.

125. Set the VOLTAGE SELECT switch to AGC 13V and using 13V control, slowly increase the voltage (not higher than 16 VDC) until an AGC fail or alarm occurs other than PWR FAIL. Record following voltages: (a) when PWR FAIL occurs and (b) when other alarm or fail occurs (it it does occur). If alarm or fail does not occur record "none"

on data sheet. Press ERROR RESET pushbutton. Repeat steps 121, 122 and 123.

126. Lower the voltage using procedure of step 125 (no lower limit). Record following voltage: (a) when PWR FAIL occurs and (b) when other AGC alarms or fails occurs. Press ERROR RESET pushbutton. Repeat steps 121, 122 and 123.

127. Set the VOLTAGE SELECT switch to AGC 3V position and using 3V control, slowly decrease the voltage (not lower than 2VDC) until an AGC fail or alarm occurs other than the PWR FAIL. (Obtain control as stated in step 121.) Record following voltages: (a) when PWR FAIL occurs, and (b) when other alarm or fail occurs (if it does occur). If alarm or fail does not occur record "none" on data sheet. Repeat steps 121, 122 and 123.

128. Increase the voltage using procedure of step 127 (until control is lost, but not higher than 3.5 VDC). Record following voltage: (a) when PWR FAIL occurs and (b) when other AGC alarms or fails occur. If alarm or fail does not occur record "none" on data sheet. Press ERROR RESET pushbutton.

129. Using 3V control, adjust until voltmeter indicated 3.0 (±0.1) VDC. (Obtain control as stated in step 121.)

130. Set 3V and 13V switches on POWER CONTROL panel to OFF and STRT 1 and 2 switches on BUFFER Circuit Assembly to ON.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

JDC
NO. 10039
REV. B
INITIAL TDRR 21539

JOB AGC OPERATIONAL TEST

ASSEMBLY UNDER TEST

TITLE ________

SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION

TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ____ CAL DATE

NAME ________ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
55	Frequency	KC	102.3				102.5		
57a	Positive Amplitude	V P-P	5				9		
57b	Pulse Width	μ sec	2.5				3.5		
57c	Zero Shift	V P-P							
57d	Rise Time	μ sec	0				0.2		
57e	Negative Amplitude	V P-P	0				8.5		
73a	Amplitude	V P-P	5				9		
73b	Pulse Width	μ sec	2				6		
73c	Droop	V P-P	0				1.4		
73d	Rise Time	μ sec	0				0.2		
76	Pulse delay	μ sec	0				1		
82	DLNK Data, No Pulse Noise, Pos	V Peak	0				+0.4		
	DLNK Data, No. Pulse Noise, Neg	V Peak	0				-6.0		
83	Eng. On, No Pulse Noise	V P-P	0				0.4		

* TO BE USED AS REQUIRED OR DESIRED

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 10039
REV. B

JOB AGC OPERATIONAL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
2 thru 14 16 thru 19 26, 28 thru 32, 35, 44, 49, 81, 84, 94, 102, 106, 109, 112, 113, 114, 117	AGC DISPLAYS	All displays responded as required (Record all discrepancies in REMARKS portion of data sheet.)							
125(a)	13 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
(b)	13 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
126(a)	13 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
(b)	13 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
127(a)	3 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
(b)	3 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
128(a)	3 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
(b)	3 Volt Hi Voltage	Volts dc	▨				▨	▨	▨

* TO BE USED AS REQUIRED OR DESIRED

REMARKS:

JOB AGC OPERATIONAL TEST | JDC 10039 REV. C PAGE 1 OF 9

SUBSYSTEM G & N SYSTEM | INITIAL TDRR 21539 D.S. PGS 2

ASSY

DESCRIPTION The MAIN PANEL and G & N AGC DSKY alarm displays and alarm circuitry, are verified through routines entered through both DSKY's. The AGC INSTRUCTION words and control pulses are verified as well as AGC-S/C and telemetry interface. All DSKY functions are verified and the ability of the AGC to accept data loaded through the DSKY is checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	11-30-65	24451	All	All	WK	TM
B	3-8-66	26921	3,6,8		WK	ACM
C	5-6-66	28584	1,6,8	1	MM	ACM

M)

REFERENCES Paragraph 3-3.3 of ATP 1026000

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. This JDC utilizes the CTS. See JDC's 10002 and 10004 for cable interconnection and JDC 10007 for CTS switch initialization and turn-on procedure.

NOTE: Insure that DOWNLINK switch on SYSTEM INTERFACE panel is set to DL2 and DOWNLINK ENABLE switch is not lighted.

NOTE: Due to having the system in coarse align for prolonged periods, the PGNS lamp may illuminate.

1. Insure that TRANSFER switch on IMU CONTROL panel is set to MANUAL and COARS ALIGN pushbutton is lighted.

2. Enter (and verify) VERB 05, NOUN 05 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 05-05.

3. Enter (and verify) VERB 50, NOUN 50 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 50-50.

4. Repeat steps 2 and 3 using the MAIN PANEL DSKY.

5. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Ignore all alarm indications.

6. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. The MP and G & N AGC DSKY displays shall be blank, except for 00 in the PROGRAM DISPLAY lamps.

7. Enter (and verify) VERB 25, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 25-02 (flashing).

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8. Enter address 01775_8 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 21-02 (flashing) and row 3 shall indicate 01775.

9. Enter + 88888 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 22-02 (flashing) and row 1 shall indicate + 88888.

10. Enter +88888 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 23-02 (flashing) and row 2 shall indicate +88888.

11. Enter +88888 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 23-02 (flashing) and row 3 shall indicate +88888.

12. Vary BRIGHTNESS CONTROL on MAIN PANEL and G & N AGC DSKY to both limit positions. All AGC DSKY displays shall vary in brightness from off to bright.

13. Press CLEAR pushbuttons on G & N AGC DSKY three times. All rows of the MAIN PANEL and G & N AGC DSKY shall be blank.

14. Repeat steps 7 through 11 and step 13 using the MAIN PANEL DSKY.

15. Enter (and verify) VERB 25, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

16. Enter address 01775_8 into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter +00123 into G & N AGC DSKY, press ENTER pushbutton: enter -00456, press ENTER pushbutton: and enter -00789, press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY shall indicate +00123, -00456, and -00789 in rows 1, 2 and 3 respectively.

18. Enter (and verify) VERB 05. NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01775_8 and press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY shall indicate 00173, 77067, and 76352 in rows 1, 2 and 3 respectively.

19. Repeat steps 15 through 18 using the MAIN PANEL DSKY.

20. Enter (and verify) VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

21. Enter (and verify) 01762_8 into G & N AGC DSKY. Press ENTER pushbutton.

22. Enter (and verify) 00000 into G & N AGC DSKY. Press ENTER pushbutton.

23. Enter (and verify) VERB 21, NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton.

24. Enter (and verify) 02000_8 into G & N AGC DSKY. Press ENTER pushbutton.

25. Enter (and verify) VERB 20, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

26. Enter (and verify) address 14422_8 into G & N AGC DSKY. Press ENTER pushbutton. The ACTIVITY COMP lamp on the G & N AGC DSKY and MP DSKY and the T AGC ACT lamp on the System Interface panel shall be lit for approximately 20 seconds.

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27. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

28. Enter address 00011_8 into G & N AGC DSKY, press ENTER pushbutton: enter 00025_8, press ENTER pushbutton. The PROGRAM ALARM, CHECK FAIL and KEY RELEASE lamps on the G & N AGC DSKY and COMP FAIL and KEY RELEASE on MP DSKY shall light.

29. Press TEST ALARM pushbutton on G & N AGC DSKY. The RUPTLOCK, PARITY FAIL, TC TRAP, and COUNTER FAIL lamps on the G & N AGC DSKY shall light.

30. Observe the SYSTEM INTERFACE panel of CTS and verify that the following lamps have lighted.

a. T PROG CH
b. T PROG AL
c. T KEY REL
d. T RUPT AL
e. T PAR F
f. T TC TRAP
g. T CNT F

31. Press ERROR RESET pushbutton on MAIN PANEL DSKY. All lamps shall go out except KEY RELEASE on G & N AGC DSKY and KEY RELEASE on MP DSKY.

32. Enter (and verify) VERB 35 into G & N AGC DSKY. Press ENTER pushbutton. KEY RELEASE lamp on G & N AGC DSKY and MP DSKY shall go out.

33. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton.

34. Enter (and verify) VERB 16, NOUN 65 into G & N AGC DSKY. Press ENTER pushbutton.

35. Observe that the number displayed in R2 of the DSKY is changing. Disregard R1 display.

36. Enter VERB 31, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

37. Enter 77777_8 into G & N AGC DSKY. Press ENTER pushbutton. The PARITY FAIL lamp shall light.

38. Press ERROR RESET pushbutton.

39. Enter VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

40. Enter 01700_8 into G & N AGC DSKY. Press ENTER pushbutton.

41. Repeat step 40.

42. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 04000_8 and press ENTER pushbutton.

43. Enter VERB 20 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

44. Enter 01700_8 into G & N AGC DSKY. Press ENTER pushbutton. The TC TRAP lamp shall light on the G & N AGC DSKY.

45. Press ERROR RESET pushbutton.

46. Enter VERB 24, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700_8 and press ENTER pushbutton.

47. Enter 20017 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700 and press ENTER pushbutton.

48. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 04000_8 and press ENTER pushbutton.

49. Enter VERB 20 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700_8 and press ENTER pushbutton. The RUPT LOCK lamp shall light on G & N AGC DSKY. Press ERROR RESET pushbutton.

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50. Press SCOPE PROBES 1:1 to light pushbutton and set CHANNEL A-B SELECT to CHAN B DIFF and CHANNEL B selectors to 200 and 20 on SYSTEM INTERFACE panel of CTS.

51. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

52. Enter address 00011_8 into G & N AGC DSKY. Press ENTER pushbutton.

53. Enter data 10000_8 into G & N AGC DSKY. Press ENTER pushbutton.

54. Set COUNTER switch on SYSTEM INTERFACE panel of CTS to CHAN A and CHAN B and FREQUENCY COUNTER CONTROL as follows:

FUNCTION to FREQ A
FREQ-TIME to KC

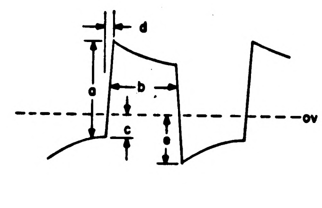
55. Measure and record the frequency. Set the COUNTER switch on SYSTEM INTERFACE panel to OFF.

56. On the OSCILLOSCOPE set the MODE switch to A+B, the Channel A switch to NORM D. C. and the Channel B switch to INVERT D. C. and synchronize the trace on the OSCILLOSCOPE.

57. Measure the following characteristics:

a. Positive Amplitude. (Neglect overshoot)
b. Pulse Width at 50% Amplitude.
c. Zero Shift.
d. Rise Time at 10-90%.
e. Negative Amplitude (as referenced to 0 VDC).

Record 1/2 (a) in MAX VALUE column of item 57 (c) on Data Sheet.



NOTE: Insure UPTEL switch is set to BLOCK.

58. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

59. Enter (and verify) address 01273 into G & N AGC DSKY. Press ENTER pushbutton.

60. Enter (and verify) 25252 into G & N AGC DSKY. Press ENTER pushbutton.

61. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.

62. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS
25252	1274
25252	1275
25252	1276
25252	1277
25252	1300
25252	1301
25252	1302
25252	1303
25252	1304
25252	1305
25252	1306

63. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

64. Enter (and verify) address 01327 into G & N AGC DSKY. Press ENTER pushbutton.

65. Enter (and verify) 25252 into G & N AGC DSKY. Press ENTER pushbutton.

66. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.

67. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS
25252	01330
25252	01331
25252	01332
25252	01333
25252	01334
25252	01335
25252	01336
25252	01337
25252	01340
25252	01341
25252	01342

68. Enter (and verify) VERB 25 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

69. Enter (and verify) address 00720 into G & N AGC DSKY. Press ENTER pushbutton.

70. Enter (and verify) data 25252 into G & N AGC DSKY three times. Press ENTER pushbutton after each entry. Enter VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 00011 and press ENTER pushbutton. Enter 10000 and press ENTER pushbutton.

71. Set AGC X FORMER switch to LOW ONE 2, DOWNLINK switch to DL1, press DOWNLINK ENABLE SW to light pushbutton, and press RESET pushbutton. Press ERROR RESET pushbutton on G & N AGC DSKY. TL FAIL, and T TEL AL lights shall go out.

72. Set CHANNEL A-B SELECT to CHAN A DIFF, CHANNEL A selectors to 100 and 2, and CHANNEL B selectors to 100 and 1.

73. Synchronize OSCILLOSCOPE waveform and measure the following pulse characteristics:

a. Amplitude (A)
b. Width at A/2
c. Droop at 2.0 μ sec
d. Rise Time at 10-90% A

74. Set CHANNEL A-B SELECT switch to A-B, CHANNEL A selectors to 300 and 7, and CHANNEL B selectors to 100 and 2.

75. Set the MODE switch on OSCILLOSCOPE to ALT and Channel B to NORM DC.

76. Adjust both traces on the OSCILLOSCOPE and measure and record the delay between the leading edge of CHANNEL A and the leading edge of CHANNEL B traces.

77. Set CHANNEL A-B SELECT to CHAN B DIFF, and CHANNEL A selectors to 100 and 1. Set the EXT SYNC switch of the SYSTEM INTERFACE PANEL to SY-1 position and the triggering SOURCE switch of the OSCILLOSCOPE to EXT position.

78. Set the MODE switch on the OSCILLOSCOPE to A & B, Channel A switch to NORM DC, and the Channel B switch to INVERT DC. Synchronize trace. Establish the mean amplitude of the pulse as "0" vdc on a grid reference line of OSCILLOSCOPE.

79. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

80. Enter address 00011$_8$ into G & N AGC DSKY. Press ENTER pushbutton.

81. Enter data 00000 into G & N AGC DSKY. Press ENTER pushbutton. The TL FAIL lamp on the G & N AGC DSKY and the T TEL AL lamp on the SYSTEM INTERFACE panel shall light. The PGNScondition lamp shall light.

82. Measure and record the peak positive and negative no pulse noise level with respect to the "0" vdc reference established in step 78 on the OSCILLOSCOPE.

83. Set CHANNEL B selectors to 200 and 20. Measure and record the peak to peak noise level on the OSCILLOSCOPE.

84. Set the AGC X FORMER switch to NORMAL, DOWNLINK switch to DL2 position and press DOWNLINK ENABLE SW to extinguish pushbutton light. Press ERROR RESET pushbutton. All lamps that lighted in Step 81 shall go out.

85. Insure that TEST MODE switch on the Programmer and Monitor Panel of CTS is set to SYSTEM and that TIMING INHIBIT switch on Logic #2 Drawer is set to DOWN.

NOTE: If pre-punched test tape is available, disregard steps 86, 87, 88 and 89 and proceed directly to step 90.

86. Press TAPE PREPARE mode control switch on the Programmer and Monitor Panel.

87. Set PUNCH switch to ON.

88. Using the "0" and "1" keys on the Programmer and Monitor panel octal keyboard, make a tape by punching the following "0" and "1" groups from left to right from the following table. Provide spacing between the alphabetical rows on the tape by pressing the BUZZ button on the tape punch. This tape should be prepared very carefully to insure a successful test.

a.	110	001	011	101	0001
b.	100	010	111	010	0010
c.	100	001	111	100	0001
d.	111	111	000	001	1111
e.	110	000	011	111	0000
f.	100	010	111	010	0010
g.	111	100	000	111	1100
h.	110	000	011	111	0000
i.	100	001	111	100	0001
j.	100	111	110	000	0111
k.	110	000	011	111	0000
l.	110	000	011	111	0000
m.	111	100	000	111	1100
n.	110	000	011	111	0000

o.	100	001	111	100	0001
p.	100	010	111	010	0010
q.	100	011	111	000	0011
r.	100	100	110	110	0100
s.	111	100	000	111	1100

Press STOP CODE button.

89. Set PUNCH switch to OFF and remove tape.

90. Put tape into TAPE READER.

91. Set READER switch to ON.

92. Press TAPE-UPLINK mode control switch.

93. Set TAPE FREERUN/STEP switch to FREERUN.

94. Set UPTEL switch on MP DSKY to ACCEPT. The ACC UPL lamp on SYSTEM INTERFACE panel shall light. Enter VERB 36 into MP DSKY. Press ENTER pushbutton.

95. Press EXECUTE pushbutton on Programmer and Monitor panel.

96. After tape is finished, set READER switch to OFF.

97. Enter (and verify) VERB 01, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

98. Enter address 01700$_8$ into G & N AGC DSKY. Press ENTER pushbutton.

99. The G & N AGC DSKY shall display 01234 in register R1.

100. Enter VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

101. Enter address 01700$_8$ into G & N AGC DSKY. Press ENTER pushbutton. Enter (and verify) 00000 into G & N AGC DSKY. Press ENTER pushbutton.

102. Set UPTEL switch on MP DSKY to BLOCK. The ACC UPL lamp on SYSTEM INTERFACE panel shall go out.

103. Rewind tape and put tape into TAPE READER.

104. Repeat steps 91, 92, and 95 through 98.

105. The G & N AGC DSKY shall display 00000 in register R1.

106. Press KEY RELEASE pushbutton. The UPTL light shall go off.

107. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

108. Enter (and verify) address 00745$_8$ into G & N AGC DSKY. Press ENTER pushbutton.

109. Enter (and verify) data 43777$_8$ into G & N AGC DSKY. Press ENTER pushbutton. The following lamps on the SYSTEM INTERFACE panel shall light.

a. G/N Δ V
b. CM/SM SEP
c. G.M.P.C.
d. G/N ATT
e. X TRANS
f. G/N ENTRY
g. AUTO .05G
h. TELECOM
i. C33
j. G/N FAIL
k. FDAI-A

110. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

111. Enter (and verify) address 00745$_8$ into G & N AGC DSKY. Press ENTER pushbutton.

112. Enter (and verify) data 40000 into G & N AGC DSKY. Press ENTER pushbutton. All lamps shall extinguish that were lighted in step 109.

113. Press DSKY RELAY RETURNS #1 pushbutton. All lamps listed in step 109 shall light on SYSTEM INTERFACE panel. Release pushbutton, all of above lamps shall go out.

114. Press DSKY RELAY RETURNS #2 pushbuttons on SYSTEM INTERFACE panel. All 14 lamps prefixed with T shall light and shall go out when pushbutton is released.

115. Press and light each of following pushbuttons on SYSTEM INTERFACE panel of CTS: (Ignore Program Alarm if it occurs in this step.)

a. IN2-5 LIFT OFF
b. IN2-6 GUIDANCE RELEASE
c. IN2-7 SATURN ULLAGE
d. IN2-8 S IV B SEPARATE
e. IN2-9 SM/CM SEPARATE
f. IN2-13 SCS ΔV MODE
g. IN2-14 G/N MON MODE
h. INO-11 G/N ATT CONT MODE
i. INO-12 G/N ΔV MODE
j. INO-13 G/N ENTRY MODE

116. Enter (and verify) VERB 01 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

117. Enter (and verify) address 00004 into G & N AGC DSKY. Press ENTER pushbutton. R$_1$ shall indicate 16XXX.

118. Press ENTER pushbutton on G & N AGC DSKY. Enter (and verify) 00006 into G & N AGC DSKY. Press ENTER pushbutton. R$_1$ shall indicate 3X76X or 3X77X.

119. Press all pushbuttons listed in step 115 to insure pushbutton lights go out.

120. Set the AGC Voltage Control 3V and 13V controls on the CTS POWER CONTROL panel to midrange and set the 3V and 13V switches to ON.

121. Set the VOLTAGE SELECT switch to AGC 3V and adjust 3V control for a voltmeter reading of 3.0 (±0.1) VDC. (If control does not vary voltage, set 3V switch to OFF, turn voltage control fully counterclockwise and back to midrange, set 3V switch to ON, and then adjust.) Set VOLTAGE SELECT switch to AGC 13V and adjust 13V control for a voltmeter reading of 13.0 (±0.5) VDC.

122. Press ERROR RESET. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter (and verify) VERB 21, NOUN 27, into G & N AGC DSKY. Press ENTER pushbutton.

123. Enter (and verify) 70000 into G & N AGC DSKY. Press ENTER pushbutton.

124. Set STRT 1 and 2 switches, on BUFFER Circuit Assembly, to OFF and ALGA switch to ON.

125. Set the VOLTAGE SELECT switch to AGC 13V and using 13V control, slowly increase the voltage (not higher than 16 VDC) until an AGC fail or alarm occurs other than PWR FAIL. Record following voltages: (a) when PWR FAIL occurs and (b) when other alarm or fail occurs (if it does occur). If alarm or fail does not occur record "none"

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SUBSYSTEM G & N SYSTEM | ASSY

on data sheet. Press ERROR RESET pushbutton. Repeat steps 121, 122 and 123.

126. Lower the voltage using procedure of step 125 (no lower limit). Record following voltage: (a) when PWR FAIL occurs and (b) when other AGC alarms or fails occurs. Press ERROR RESET pushbutton. Repeat steps 121, 122 and 123.

127. Set the VOLTAGE SELECT switch to AGC 3V position and using 3V control, slowly decrease the voltage (not lower than 2VDC) until an AGC fail or alarm occurs other than the PWR FAIL. (Obtain control as stated in step 121.) Record following voltages: (a) when PWR FAIL occurs, and (b) when other alarm or fail occurs (if it does occur). If alarm or fail does not occur record "none" on data sheet. Repeat steps 121, 122 and 123.

128. Increase the voltage using procedure of step 127 (until control is lost, but not higher than 3.5 VDC). Record following voltage: (a) when PWR FAIL occurs and (b) when other AGC alarms or fails occur. If alarm or fail does not occur record "none" on data sheet. Press ERROR RESET pushbutton.

129. Using 3V control, adjust until voltmeter indicated 3.0 (±0.1) VDC. (Obtain control as stated in step 121.)

130. Set 3V and 13V switches on POWER CONTROL panel to OFF and STRT 1 and 2 switches on BUFFER Circuit Assembly to ON.

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

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REV. C
INITIAL TDRR 21539

JOB AGC OPERATIONAL TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
55	Frequency	KC	102.3				102.5		
57a	Positive Amplitude	V P-P	5				9		
57b	Pulse Width	μ sec	2.5				3.5		
57c	Zero Shift	V P-P							
57d	Rise Time	μsec	0				0.2		
57e	Negative Amplitude	V P-P	0				8.5		
73a	Amplitude	V P-P	5				9		
73b	Pulse Width	μsec	2				6		
73c	Droop	V P-P	0				1.4		
73d	Rise Time	μ sec	0				0.2		
76	Pulse delay	μ sec	0				1		
82	DLNK Data, No Pulse Noise, Pos	V Peak	0				+0.4		
	DLNK Data, No. Pulse Noise, Neg	V Peak	0				-6.0		
83	Eng. On, No Pulse Noise	V P-P	0				0.4		

*** TO BE USED AS REQUIRED OR DESIRED**

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 10039
REV. C

JOB AGC OPERATIONAL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
2 thru 14 16 thru 19 26, 28 thru 32, 35, 44, 49, 81, 84, 94, 102, 106, 109, 112, 113, 114, 117	AGC DISPLAYS		All displays responded as required (Record all discrepancies in REMARKS portion of data sheet.)						
125(a)	13 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
(b)	13 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
126(a)	13 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
(b)	13 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
127(a)	3 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
(b)	3 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
128(a)	3 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
(b)	3 Volt Hi Voltage	Volts dc	▨				▨	▨	▨

*** TO BE USED AS REQUIRED OR DESIRED**

REMARKS:

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INITIAL TDRR 21539 **D.S. PGS** 2

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION The MAIN PANEL and G & N AGC DSKY alarm displays and alarm circuitry, are verified through routines entered through both DSKY's. The AGC INSTRUCTION words and control pulses are verified as well as AGC-S/C and telemetry interface. All DSKY functions are verified and the ability of the AGC to accept data loaded through the DSKY is checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	11-30-65	24451	All	All	WK	TM
B	3-8-66	26921	3,6,8		WK	ACM
C	5-6-66	28584	1,6,8	1	MM	ACM
D	7-21-66	30258	1,8-17	1	EA	-

REFERENCES Paragraph 3-3.3 of ATP 1026000

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000

IMPORTANT: 1. When utilizing Block I-100 CTS, perform procedures indicated in paragraph A. PROCEDURES. When utilizing Block II CTS, perform procedures indicated in paragraph B. PROCEDURES.

2. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

3. This JDC utilizes the CTS. See JDC's 10002 and 10004 for cable interconnection and JDC 10007 for CTS switch initialization and turnon procedures.

NOTE: 1. With Block I-100 CTS insure that DOWNLINK switch on System Interface panel is set to DL 2 and DOWNLINK ENABLE switch is not lighted.

2. With Block II CTS, insure that DL ENABLE and

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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SUBSYSTEM G & N SYSTEM **ASSY**

WORD RATE 50 PPS pushbuttons on XY Interface panel are lighted.

3. Due to having the system in coarse align for prolonged periods the PGNS lamp may light.

A. PROCEDURES

1. Insure that TRANSFER switch on IMU CONTROL panel is set to MANUAL and COARS ALIGN pushbutton is lighted.
2. Enter (and verify) VERB 05, NOUN 05 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 05-05.
3. Enter (and verify) VERB 50, NOUN 50 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 50-50.
4. Repeat steps 2 and 3 using the MAIN PANEL DSKY.
5. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Ignore all alarm indications.
6. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. The MP and G & N AGC DSKY displays shall be blank, except for 00 in the PROGRAM DISPLAY lamps.
7. Enter (and verify) VERB 25, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 25-02 (flashing).
8. Enter address 01775_8 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 21-02 (flashing) and row 3 shall indicate 01775.
9. Enter + 88888 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 22-02 (flashing) and row 1 shall indicate + 88888.
10. Enter +88888 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 23-02 (flashing) and row 2 shall indicate +88888.
11. Enter +88888 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 23-02 (flashing) and row 3 shall indicate +88888.
12. Vary BRIGHTNESS CONTROL on MAIN PANEL and G & N AGC DSKY to both limit positions. All AGC DSKY displays shall vary in brightness from off to bright.
13. Press CLEAR pushbuttons on G & N AGC DSKY three times. All rows of the MAIN PANEL and G & N AGC DSKY shall be blank.
14. Repeat steps 7 through 11 and step 13 using the MAIN PANEL DSKY.
15. Enter (and verify) VERB 25, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
16. Enter address 01775_8 into G & N AGC DSKY. Press ENTER pushbutton.
17. Enter +00123 into G & N AGC DSKY,

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SUBSYSTEM G & N SYSTEM **ASSY**

press ENTER pushbutton: enter -00456, press ENTER pushbutton: and enter -00789, press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY shall indicate +00123, -00456, and -00789 in rows 1, 2 and 3 respectively.

18. Enter (and verify) VERB 05. NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01775_8 and press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY shall indicate 00173, 77067, and 76352 in rows 1, 2 and 3 respectively.
19. Repeat steps 15 through 18 using the MAIN PANEL DSKY.
20. Enter (and verify) VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.
21. Enter (and verify) 01762_8 into G & N AGC DSKY. Press ENTER pushbutton.
22. Enter (and verify) 00000 into G & N AGC DSKY. Press ENTER pushbutton.
23. Enter (and verify) VERB 21, NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton.
24. Enter (and verify) 02000_8 into G & N AGC DSKY. Press ENTER pushbutton.
25. Enter (and verify) VERB 20, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.
26. Enter (and verify) address 14422_8 into G & N AGC DSKY. Press ENTER pushbutton. The ACTIVITY COMP lamp on the G & N AGC DSKY and MP DSKY and the T AGC ACT lamp on the System Interface panel shall be lit for approximately 20 seconds.
27. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
28. Enter address 00011_8 into G & N AGC DSKY, press ENTER pushbutton: enter 00025_8, press ENTER pushbutton. The PROGRAM ALARM, CHECK FAIL and KEY RELEASE lamps on the G & N AGC DSKY and COMP FAIL and KEY RELEASE on MP DSKY shall light.
29. Press TEST ALARM pushbutton on G & N AGC DSKY. The RUPTLOCK, PARITY FAIL, TC TRAP, and COUNTER FAIL lamps on the G & N AGC DSKY shall light.
30. Observe the SYSTEM INTERFACE panel of CTS and verify that the following lamps have lighted.
    - a. T PROG CH
    - b. T PROG AL
    - c. T KEY REL
    - d. T RUPT AL
    - e. T PAR F
    - f. T TC TRAP
    - g. T CNT F
31. Press ERROR RESET pushbutton on MAIN PANEL DSKY. All lamps shall go out except KEY RELEASE on G & N AGC DSKY and KEY RELEASE on MP DSKY.
32. Enter (and verify) VERB 35 into G & N AGC DSKY. Press ENTER pushbutton. KEY RELEASE lamp on G & N AGC DSKY and MP DSKY shall go out.
33. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton.
34. Enter (and verify) VERB 16, NOUN 65 into G & N AGC DSKY. Press ENTER pushbutton.

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SUBSYSTEM G & N SYSTEM **ASSY**

35. Observe that the number displayed in R2 of the DSKY is changing. Disregard R1 display.
36. Enter VERB 31, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.
37. Enter 77777_8 into G & N AGC DSKY. Press ENTER pushbutton. The PARITY FAIL lamp shall light.
38. Press ERROR RESET pushbutton.
39. Enter VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
40. Enter 01700_8 into G & N AGC DSKY. Press ENTER pushbutton.
41. Repeat step 40.
42. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 04000_8 and press ENTER pushbutton.
43. Enter VERB 20 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
44. Enter 01700_8 into G & N AGC DSKY. Press ENTER pushbutton. The TC TRAP lamp shall light on the G & N AGC DSKY.
45. Press ERROR RESET pushbutton.
46. Enter VERB 24, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700_8 and press ENTER pushbutton.
47. Enter 20017 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700 and press ENTER pushbutton.
48. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 04000_8 and press ENTER pushbutton.
49. Enter VERB 20 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700_8 and press ENTER pushbutton. The RUPT LOCK lamp shall light on G & N AGC DSKY. Press ERROR RESET pushbutton.
50. Press SCOPE PROBES 1:1 to light pushbutton and set CHANNEL A-B SELECT to CHAN B DIFF and CHANNEL B selectors to 200 and 20 on SYSTEM INTERFACE panel of CTS.
51. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
52. Enter address 00011_8 into G & N AGC DSKY. Press ENTER pushbutton.
53. Enter data 10000_8 into G & N AGC DSKY. Press ENTER pushbutton.
54. Set COUNTER switch on SYSTEM INTERFACE panel of CTS to CHAN A and CHAN B and FREQUENCY COUNTER CONTROL as follows:

    FUNCTION to FREQ A

    FREQ-TIME to KC
55. Measure and record the frequency. Set the COUNTER switch on SYSTEM INTERFACE panel to OFF.
56. On the OSCILLOSCOPE set the MODE switch to A+B, the Channel A switch to NORM D. C. and the Channel B switch to INVERT D. C. and synchronize the trace on the OSCILLOSCOPE.
57. Measure the following characteristics:
    - a. Positive Amplitude. (Neglect overshoot)
    - b. Pulse Width at 50% Amplitude.
    - c. Zero Shift.
    - d. Rise Time at 10-90%.

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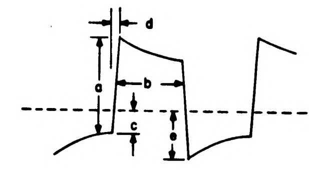
e. Negative Amplitude (as referenced to 0 VDC).

Record 1/2 (a) in MAX VALUE column of item 57 (c) on Data Sheet.



NOTE: Insure UPTEL switch is set to BLOCK.

58. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

59. Enter (and verify) address 01273 into G & N AGC DSKY. Press ENTER pushbutton.

60. Enter (and verify) 25252 into G & N AGC DSKY. Press ENTER pushbutton.

61. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.

62. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS
25252	1274
25252	1275
25252	1276
25252	1277
25252	1300
25252	1301
25252	1302
25252	1303
25252	1304
25252	1305
25252	1306

63. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

64. Enter (and verify) address 01327 into G & N AGC DSKY. Press ENTER pushbutton.

65. Enter (and verify) 25252 into G & N AGC DSKY. Press ENTER pushbutton.

66. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.

67. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS
25252	01330
25252	01331
25252	01332
25252	01333
25252	01334
25252	01335
25252	01336
25252	01337
25252	01340
25252	01341
25252	01342

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68. Enter (and verify) VERB 25 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

69. Enter (and verify) address 00720 into G & N AGC DSKY. Press ENTER pushbutton.

70. Enter (and verify) data 25252 into G & N AGC DSKY three times. Press ENTER pushbutton after each entry. Enter VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 00011 and press ENTER pushbutton. Enter 10000 and press ENTER pushbutton.

71. Set AGC X FORMER switch to LOW ONE 2, DOWNLINK switch to DL1, press DOWNLINK ENABLE SW to light pushbutton, and press RESET pushbutton. Press ERROR RESET pushbutton on G & N AGC DSKY. TL FAIL, and T TEL AL lights shall go out.

72. Set CHANNEL A-B SELECT to CHAN A DIFF, CHANNEL A selectors to 100 and 2, and CHANNEL B selectors to 100 and 1.

73. Synchronize OSCILLOSCOPE waveform and measure the following pulse characteristics:________

a. Amplitude (A)

b. Width at A/2

c. Droop at 2.0 μ sec

d. Rise Time at 10-90% A

74. Set CHANNEL A-B SELECT switch to A-B, CHANNEL A selectors to 300 and 7, and CHANNEL B selectors to 100 and 2.

75. Set the MODE switch on OSCILLOSCOPE to ALT and Channel B to NORM DC.

76. Adjust both traces on the OSCILLOSCOPE and measure and record the delay between the leading edge of CHANNEL A and the leading edge of CHANNEL B traces.________

77. Set CHANNEL A-B SELECT to CHAN B DIFF, and CHANNEL A selectors to 100 and 1. Set the EXT SYNC switch of the SYSTEM INTERFACE PANEL to SY-1 position and the triggering SOURCE switch of the OSCILLOSCOPE to EXT position.

78. Set the MODE switch on the OSCILLOSCOPE to A & B, Channel A switch to NORM DC, and the Channel B switch to INVERT DC. Synchronize trace. Establish the mean amplitude of the pulse as "0" vdc on a grid reference line of OSCILLOSCOPE.________

79. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

80. Enter address 00011_8 into G & N AGC DSKY. Press ENTER pushbutton.

81. Enter data 00000 into G & N AGC DSKY. Press ENTER pushbutton. The TL FAIL lamp on the G & N AGC DSKY and the T TEL AL lamp on the SYSTEM INTERFACE panel shall light. The PGNScondition lamp shall light.

82. Measure and record the peak positive and negative no pulse noise level with respect to the "0" vdc reference established in step 78 on the OSCILLOSCOPE.

83. Set CHANNEL B selectors to 200 and 20. Measure and record the peak to peak noise level on the OSCILLOSCOPE.

84. Set the AGC X FORMER switch to NORMAL, DOWNLINK switch to DL2 position and press DOWNLINK ENABLE SW to

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extinguish pushbutton light. Press ERROR RESET pushbutton. All lamps that lighted in Step 81 shall go out.

85. Insure that TEST MODE switch on the Programmer and Monitor Panel of CTS is set to SYSTEM and that TIMING INHIBIT switch on Logic #2 Drawer is set to DOWN.

NOTE: If pre-punched test tape is available, disregard steps 86, 87, 88 and 89 and proceed directly to step 90.

86. Press TAPE PREPARE mode control switch on the Programmer and Monitor Panel.

87. Set PUNCH switch to ON.

88. Using the "0" and "1" keys on the Programmer and Monitor panel octal keyboard, make a tape by punching the following "0" and "1" groups from left to right from the following table. Provide spacing between the alphabetical rows on the tape by pressing the BUZZ button on the tape punch. This tape should be prepared very carefully to insure a successful test.

a.	110	001	011	101	0001
b.	100	010	111	010	0010
c.	100	001	111	100	0001
d.	111	111	000	001	1111
e.	110	000	011	111	0000
f.	100	010	111	010	0010
g.	111	100	000	111	1100
h.	110	000	011	111	0000
i.	100	001	111	100	0001
j.	100	111	110	000	0111
k.	110	000	011	111	0000
l.	110	000	011	111	0000
m.	111	100	000	111	1100
n.	110	000	011	111	0000
o.	100	001	111	100	0001
p.	100	010	111	010	0010
q.	100	011	111	000	0011
r.	100	100	110	110	0100
s.	111	100	000	111	1100

Press STOP CODE button.

89. Set PUNCH switch to OFF and remove tape.

90. Put tape into TAPE READER.

91. Set READER switch to ON.

92. Press TAPE-UPLINK mode control switch.

93. Set TAPE FREERUN/STEP switch to FREERUN.

94. Set UPTEL switch on MP DSKY to ACCEPT. The ACC UPL lamp on SYSTEM INTERFACE panel shall light. Enter VERB 36 into MP DSKY. Press ENTER pushbutton.

95. Press EXECUTE pushbutton on Programmer and Monitor panel.

96. After tape is finished, set READER switch to OFF.

97. Enter (and verify) VERB 01, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

98. Enter address 01700_8 into G & N AGC DSKY. Press ENTER pushbutton.

99. The G & N AGC DSKY shall display 01234 in register R1.

100. Enter VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

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101. Enter address 01700_8 into G & N AGC DSKY. Press ENTER pushbutton. Enter (and verify) 00000 into G & N AGC DSKY. Press ENTER pushbutton.

102. Set UPTEL switch on MP DSKY to BLOCK. The ACC UPL lamp on SYSTEM INTERFACE panel shall go out.

103. Rewind tape and put tape into TAPE READER.

104. Repeat steps 91, 92, and 95 through 98.

105. The G & N AGC DSKY shall display 00000 in register R1.

106. Press KEY RELEASE pushbutton. The UPTL light shall go off.

107. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

108. Enter (and verify) address 00745_8 into G & N AGC DSKY. Press ENTER pushbutton.

109. Enter (and verify) data 43777_8 into G & N AGC DSKY. Press ENTER pushbutton. The following lamps on the SYSTEM INTERFACE panel shall light.

a. G/N Δ V
b. CM/SM SEP
c. G.M.P.C.
d. G/N ATT
e. X TRANS
f. G/N ENTRY
g. AUTO .05G
h. TELECOM
i. C33
j. G/N FAIL
k. FDAI-A

110. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

111. Enter (and verify) address 00745_8 into G & N AGC DSKY. Press ENTER pushbutton.

112. Enter (and verify) data 40000 into G & N AGC DSKY. Press ENTER pushbutton. All lamps shall extinguish that were lighted in step 109.

113. Press DSKY RELAY RETURNS #1 pushbutton. All lamps listed in step 109 shall light on SYSTEM INTERFACE panel. Release pushbutton, all of above lamps shall go out.

114. Press DSKY RELAY RETURNS #2 pushbuttons on SYSTEM INTERFACE panel. All 14 lamps prefixed with T shall light and shall go out when pushbutton is released.

115. Press and light each of following pushbuttons on SYSTEM INTERFACE panel of CTS: (Ignore Program Alarm if it occurs in this step.)

a. IN2-5 LIFT OFF
b. IN2-6 GUIDANCE RELEASE
c. IN2-7 SATURN ULLAGE
d. IN2-8 S IV B SEPARATE
e. IN2-9 SM/CM SEPARATE
f. INO-11 G/N ATT CONT MODE
g. INO-12 G/N ΔV MODE
h. INO-13 G/N ENTRY MODE

116. Enter (and verify) VERB 01 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

117. Enter (and verify) address 00004 into G & N AGC DSKY. Press ENTER pushbutton. R_1 shall indicate 16XXX.

118. Press ENTER pushbutton on G & N AGC DSKY. Enter (and verify) 00006 into

G & N AGC DSKY. Press ENTER pushbutton. R_1 shall indicate XX76X or XX77X.

119. Press all pushbuttons listed in step 115 to insure pushbutton lights go out.

120. Set the AGC Voltage Control 3V and 13V controls on the CTS POWER CONTROL panel to midrange and set the 3V and 13V switches to ON.

121. Set the VOLTAGE SELECT switch to AGC 3V and adjust 3V control for a voltmeter reading of 3.0 (±0.1) VDC. (If control does not vary voltage, set 3V switch to OFF, turn voltage control fully counterclockwise and back to midrange, set 3V switch to ON, and then adjust.) Set VOLTAGE SELECT switch to AGC 13V and adjust 13V control for a voltmeter reading of 13.0 (±0.5) VDC.

122. Press ERROR RESET. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter (and verify) VERB 21, NOUN 27, into G & N AGC DSKY. Press ENTER pushbutton.

123. Enter (and verify) 70000 into G & N AGC DSKY. Press ENTER pushbutton.

124. Set STRT 1 and 2 switches, on BUFFER Circuit Assembly, to OFF and ALGA switch to ON.

125. Set the VOLTAGE SELECT switch to AGC 13V and using 13V control, slowly increase the voltage (not higher than 16 VDC) until an AGC fail or alarm occurs other than PWR FAIL. Record following voltages: (a) when PWR FAIL occurs and (b) when other alarm or fail occurs (if it does occur). If alarm or fail does not occur record "none" on data sheet. Press ERROR RESET pushbutton. Repeat steps 121, 122 and 123.

126. Lower the voltage using procedure of step 125 (no lower limit). Record following voltage: (a) when PWR FAIL occurs and (b) when other AGC alarms or fails occurs. Press ERROR RESET pushbutton. Repeat steps 121, 122 and 123.

127. Set the VOLTAGE SELECT switch to AGC 3V position and using 3V control, slowly decrease the voltage (not lower than 2VDC) until an AGC fail or alarm occurs other than the PWR FAIL. (Obtain control as stated in step 121.) Record following voltages: (a) when PWR FAIL occurs, and (b) when other alarm or fail occurs (if it does occur). If alarm or fail does not occur record "none" on data sheet. Repeat steps 121, 122 and 123.

128. Increase the voltage using procedure of step 127 (until control is lost, but not higher than 3.5 VDC). Record following voltage: (a) when PWR FAIL occurs and (b) when other AGC alarms or fails occur. If alarm or fail does not occur record "none" on data sheet. Press ERROR RESET pushbutton.

129. Using 3V control, adjust until voltmeter indicated 3.0 (±0.1) VDC. (Obtain control as stated in step 121.)

130. Set 3V and 13V switches on POWER CONTROL panel to OFF and STRT 1 and 2 switches on BUFFER Circuit Assembly to ON.

B. PROCEDURES

1. Insure that TRANSFER switch on IMU CONTROL panel is set to MANUAL and COARS ALIGN pushbutton is lighted.

2. Enter (and verify) VERB 05, NOUN 05 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 05-05.

3. Enter (and verify) VERB 50, NOUN 50 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 50-50.

4. Repeat steps 2 and 3 using the MAIN PANEL DSKY.

5. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Ignore all alarm indications.

6. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. The MP and G & N AGC DSKY displays shall be blank, except for 00 in the PROGRAM DISPLAY lamps.

7. Enter (and verify) VERB 25, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 25-02 (flashing).

8. Enter address 01775_8 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 21-02 (flashing) and row 3 shall indicate 01775.

9. Enter + 88888 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 22-02 (flashing) and row 1 shall indicate + 88888.

10. Enter +88888 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 23-02 (flashing) and row 2 shall indicate +88888.

11. Enter +88888 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 23-02 (flashing) and row 3 shall indicate +88888.

12. Vary BRIGHTNESS CONTROL on MAIN PANEL and G & N AGC DSKY to both limit positions. All AGC DSKY displays shall vary in brightness from off to bright.

13. Press CLEAR pushbuttons on G & N AGC DSKY three times. All rows of the MAIN PANEL and G & N AGC DSKY shall be blank.

14. Repeat steps 7 through 11 and step 13 using the MAIN PANEL DSKY.

15. Enter (and verify) VERB 25, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

16. Enter address 01775_8 into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter +00123 into G & N AGC DSKY, press ENTER pushbutton: enter -00456, press ENTER pushbutton: and enter -00789, press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY shall indicate +00123, -00456, and -00789 in rows 1, 2 and 3 respectively.

18. Enter (and verify) VERB 05, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01775_8 and press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY shall indicate 00173, 77067, and 76352 in rows 1, 2 and 3 respectively.

19. Repeat steps 15 through 18 using the MAIN PANEL DSKY.

20. Enter (and verify) VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

21. Enter (and verify) 01762_8 into G & N AGC DSKY. Press ENTER pushbutton.

22. Enter (and verify) 00000 into G & N AGC DSKY. Press ENTER pushbutton.

23. Enter (and verify) VERB 21, NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton.

24. Enter (and verify) 02000_8 into G & N AGC DSKY. Press ENTER pushbutton.

25. Enter (and verify) VERB 20, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

26. Enter (and verify) address 14422_8 into G & N AGC DSKY. Press ENTER pushbutton. The ACTIVITY COMP lamp on the G & N AGC DSKY and MP DSKY and the M1 lamp on the XY Interface panel shall be lit for approximately 20 seconds.

27. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

28. Enter address 00011_8 into G & N AGC DSKY, press ENTER pushbutton: enter 00025_8, press ENTER pushbutton. The PROGRAM ALARM, CHECK FAIL and KEY RELEASE lamps on the G & N AGC DSKY and COMP FAIL and KEY RELEASE on MP DSKY shall light.

29. Press TEST ALARM pushbutton on G & N AGC DSKY. The RUPTLOCK, PARITY FAIL, TC TRAP, and COUNTER FAIL lamps on the G & N AGC DSKY shall light.

30. Observe the XY Interface panel of CTS and verify that the following lamps have lighted.

a. M2
b. M11
c. M10
d. M18
e. M4
f. M9
g. M17

31. Press ERROR RESET pushbutton on MAIN PANEL DSKY. All lamps shall go out except KEY RELEASE on G & N AGC DSKY and KEY RELEASE on MP DSKY.

32. Enter (and verify) VERB 35 into G & N AGC DSKY. Press ENTER pushbutton. KEY RELEASE lamp on G & N AGC DSKY and MP DSKY shall go out.

33. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton.

34. Enter (and verify) VERB 16, NOUN 65 into G & N AGC DSKY. Press ENTER pushbutton.

35. Observe that the number displayed in R2 of the DSKY is changing. Disregard R1 display.

36. Enter VERB 31, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

37. Enter 77777_8 into G & N AGC DSKY. Press ENTER pushbutton. The PARITY FAIL lamp shall light.

38. Press ERROR RESET pushbutton.

39. Enter VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

40. Enter 01700_8 into G & N AGC DSKY. Press ENTER pushbutton.

41. Repeat step 40.

42. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 04000_8 and press ENTER pushbutton.

43. Enter VERB 20 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

44. Enter 01700_8 into G & N AGC DSKY. Press ENTER pushbutton. The TC TRAP lamp shall light on the G & N AGC DSKY.

45. Press ERROR RESET pushbutton.

46. Enter VERB 24, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700_8 and press ENTER pushbutton.

47. Enter 20017 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700 and press ENTER pushbutton.

48. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 04000_8 and press ENTER pushbutton.

49. Enter VERB 20 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700_8 and press ENTER pushbutton. The RUPT LOCK lamp shall light on G & N AGC DSKY. Press ERROR RESET pushbutton.

50. Set CHANNEL T selector on the XY Interface panel to 120. Set the SCOPE switch to DIFF T.

51. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

52. Enter address 00011_8 into G & N AGC DSKY. Press ENTER pushbutton.

53. Enter data 10000_8 into G & N AGC DSKY. Press ENTER pushbutton.

54. Set FREQ + PHASE switch on XY Interface panel of CTS to FR T POS and FREQUENCY COUNTER CONTROL as follows:

FUNCTION to FREQ A
FREQ-TIME to KC

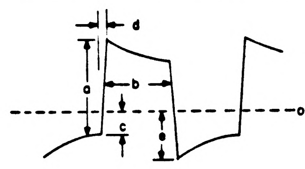
55. Measure and record the frequency. Set the FREQ + PHASE switch on XY Interface panel to OFF.

56. On the OSCILLOSCOPE set the MODE switch to A+B, the Channel A switch to NORM D. C. and the Channel B switch to INVERT D. C. and synchronize the trace on the OSCILLOSCOPE.

57. Measure the following characteristics:

a. Positive Amplitude. (Neglect overshoot)
b. Pulse Width at 50% Amplitude.
c. Zero Shift.
d. Rise Time at 10-90%.
e. Negative Amplitude (as referenced to 0 VDC).

Record 1/2 (a) in MAX VALUE column of item 57 (c) on Data Sheet.



NOTE: Insure UPTEL switch is set to BLOCK.

58. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

59. Enter (and verify) address 01273 into G & N AGC DSKY. Press ENTER pushbutton.

60. Enter (and verify) 25252 into G & N AGC DSKY. Press ENTER pushbutton.

61. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.

62. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address sh^!! appear in R3 of the DSKY.

DATA	ADDRESS
25252	1274
25252	1275
25252	1276
25252	1277
25252	1300
25252	1301
25252	1302
25252	1303
25252	1304
25252	1305
25252	1306

63. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

64. Enter (and verify) address 01327 into G & N AGC DSKY. Press ENTER pushbutton.

65. Enter (and verify) 25252 into G & N AGC DSKY. Press ENTER pushbutton.

66. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.

67. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS
25252	01330
25252	01331
25252	01332
25252	01333
25252	01334
25252	01335
25252	01336
25252	01337
25252	01340
25252	01341
25252	01342

68. Enter (and verify) VERB 25 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

69. Enter (and verify) address 00720 into G & N AGC DSKY. Press ENTER pushbutton.

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70. Enter (and verify) data 25252 into G & N AGC DSKY three times. Press ENTER pushbutton after each entry. Enter VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 00011 and press ENTER pushbutton. Enter 10000 and press ENTER pushbutton.

71. Press the DL ENABLE and WORD RATE 50 PPS pushbuttons. Press the ERROR RESET pushbutton on the G & N AGC DSKY. Press the RESET pushbutton on the Programmer and Monitor panel. The TL FAIL lamps on the G & N DSKY shall go out.

72. Set the CHANNEL T selector on the XY Interface panel to 102 (DLNK DATA) and the SCOPE switch to T → V.

73. Synchronize OSCILLOSCOPE waveform and measure the following pulse characteristics:

a. Amplitude (A)
b. Width at A/2
c. Droop at 2.0 μ sec
d. Rise Time at 10-90% A

74. Set the SCOPE switch on the XY Interface panel to S → T and CHANNEL V selector to 307 (DLNK SYNC). Measure and record the delay of one of the DLNK DATA pulses with respect to the corresponding DLNK SYNC pulse.

75. Set the MODE switch on OSCILLOSCOPE to ALT and Channel B to NORM DC.

76. Adjust both traces on the OSCILLOSCOPE and measure and record the delay between the leading edge of CHANNEL A and the leading edge of CHANNEL B traces.

77. Set the CHANNEL T selector to 101 and the SCOPE switch to DIFF T. Set the EXT TRIG SOURCE switch on the Oscilloscope to LINE. Insure the WORD RATE 50 PPS pushbutton is lighted.

78. Set the MODE switch on the OSCILLOSCOPE to A + B, Channel A switch to NORM DC, and the Channel B switch to INVERT DC. Synchronize trace. Establish the mean amplitude of the pulse as "0" vdc on a grid reference line of OSCILLOSCOPE.

79. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

80. Enter address 00011$_8$ into G & N AGC DSKY. Press ENTER pushbutton.

81. Enter data 00000 into G & N AGC DSKY. Press ENTER pushbutton. Press the WORD RATE 50 PPS and WORD RATE 300 PPS pushbuttons on the XY Interface panel. The TL FAIL lamp on the G & N AGC DSKY and the M12 lamp on the XY Interface panel shall light. The PGNS condition lamp shall light.

82. Measure and record the peak positive and negative no pulse noise level with respect to the "0" vdc reference established in step 78 on the OSCILLOSCOPE.

83. Set CHANNEL T selector on the XY Interface panel to 120. Set the SCOPE switch to DIFF T. Set the EXT TRIG SOURCE switch on the Oscilloscope to INT. Measure and record the peak to peak noise level on the Oscilloscope.

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84. Press the WORD RATE 300 PPS and WORD RATE 50 PPS pushbuttons on the XY Interface panel. Press ERROR RESET pushbutton. All lamps that were lighted in Step 81 shall go out.

85. Insure that TEST MODE switch on the Programmer and Monitor Panel of CTS is set to SYSTEM and that TIMING INHIBIT switch on Logic #2 Drawer is set to OFF.

NOTE: If pre-punched test tape is available, disregard steps 86, 87, 88 and 89 and proceed directly to step 90.

86. Press TAPE PREPARE mode control switch on the Programmer and Monitor Panel.

87. Set PUNCH switch to ON.

88. Using the "0" and "1" keys on the Programmer and Monitor panel octal keyboard, make a tape by punching the following "0" and "1" groups from left to right from the following table. Provide spacing between the alphabetical rows on the tape by pressing the BUZZ button on the tape punch. This tape should be prepared very carefully to insure a successful test.

a.	110	001	011	101	0001
b.	100	010	111	010	0010
c.	100	001	111	100	0001
d.	111	111	000	001	1111
e.	110	000	011	111	0000
f.	100	010	111	010	0010
g.	111	100	000	111	1100
h.	110	000	011	111	0000
i.	100	001	111	100	0001
j.	100	111	110	000	0111
k.	110	000	011	111	0000
l.	110	000	011	111	0000
m.	111	100	000	111	1100
n.	110	000	011	111	0000
o.	100	001	111	100	0001
p.	100	010	111	010	0010
q.	100	011	111	000	0011
r.	100	100	110	110	0100
s.	111	100	000	111	1100

Press STOP CODE button.

89. Set PUNCH switch to OFF and remove tape.

90. Put tape into TAPE READER.

91. Set READER switch to ON.

92. Press TAPE-UPLINK mode control switch.

93. Set TAPE FREERUN/STEP switch to FREERUN.

94. Set UPTEL switch on MP DSKY to ACCEPT. The ACC UPL lamp on SYSTEM INTERFACE panel shall light. Enter VERB 36 into MP DSKY. Press ENTER pushbutton.

95. Press EXECUTE pushbutton on Programmer and Monitor panel.

96. After tape is finished, set READER switch to OFF.

97. Enter (and verify) VERB 01, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

98. Enter address 01700$_8$ into G & N AGC DSKY. Press ENTER pushbutton.

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99. The G & N AGC DSKY shall display 01234 in register R1.

100. Enter VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

101. Enter address 01700$_8$ into G & N AGC DSKY. Press ENTER pushbutton. Enter (and verify) 00000 into G & N AGC DSKY. Press ENTER pushbutton.

102. Set UPTEL switch on MP DSKY to BLOCK. The ACC UPL lamp on SYSTEM INTERFACE panel shall go out.

103. Rewind tape and put tape into TAPE READER.

104. Repeat steps 91, 92, and 95 through 98.

105. The G & N AGC DSKY shall display 00000 in register R1.

106. Press KEY RELEASE pushbutton. The UPTL light shall go off.

107. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

108. Enter (and verify) address 00745$_8$ into G & N AGC DSKY. Press ENTER pushbutton.

109. Enter (and verify) data 43777$_8$ into G & N AGC DSKY. Press ENTER pushbutton. The following lamps on the SYSTEM INTERFACE panel shall light.

a. M29
b. M30
c. M25
d. M34
e. M33
f. M36
g. M35
h. M27
i. M28
j. M19
k. M20

110. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

111. Enter (and verify) address 00745$_8$ into G & N AGC DSKY. Press ENTER pushbutton.

112. Enter (and verify) data 40000 into G & N AGC DSKY. Press ENTER pushbutton. All lamps shall extinguish that were lighted in step 109.

113. Press DSKY RELAY RETURNS #1 pushbutton. All lamps listed in step 109 shall light on XY Interface panel. Release pushbutton, all of above lamps shall go out.

114. Press DSKY RELAY RETURNS #2 pushbuttons on the XY Interface panel. The following lamps shall light when the DSKY RELAY RETURNS #2 pushbutton is pressed and shall go out when the pushbutton is released.

a. M7
b. M16
c. M15
d. M8
e. M5
f. M11
g. M1
h. M12
i. M4
j. M17
k. M10
l. M18
m. M9
n. M2

115. Press and light each of following pushbuttons on RDC Interface panel of CTS: (Ignore Program Alarm if it occurs in this step.)
- a. IN2-5 LIFT OFF
- b. IN2-6 GUIDANCE RELEASE
- c. IN2-7 SATURN ULLAGE
- d. IN2-8 S IV B SEPARATE
- e. IN2-9 SM/CM SEPARATE
- f. INO-11 G/N ATT CONT MODE
- g. INO-12 G/N ΔV MODE
- h. INO-13 G/N ENTRY MODE

116. Enter (and verify) VERB 01 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

117. Enter (and verify) address 00004 into G & N AGC DSKY. Press ENTER pushbutton. R_1 shall indicate 16XXX.

118. Press ENTER pushbutton on G & N AGC DSKY. Enter (and verify) 00006 into G & N AGC DSKY. Press ENTER pushbutton. R_1 shall indicate XX76X or XX77X.

119. Press all pushbuttons listed in step 115 to insure pushbutton lights go out.

120. Set the AGC VOLTAGE CONTROLS, number 1 (3V) and number 2 (13V), on the CTS POWER CONTROL panel to midrange and set the 3V and 13V switches to ON.

121. Set the VOLTAGE SELECT switch to AGC 3V and adjust 3V control for a voltmeter reading of 3.0 (±0.1) VDC. (If control does not vary voltage, set 3V switch to OFF, turn voltage control fully counterclockwise and back to midrange, set 3V switch to ON, and then adjust.) Set VOLTAGE SELECT switch to AGC 13V and adjust 13V control for a voltmeter reading of 13.0 (±0.5) VDC.

122. Press ERROR RESET. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter (and verify) VERB 21, NOUN 27, into G & N AGC DSKY. Press ENTER pushbutton.

123. Enter (and verify) 70000 into G & N AGC DSKY. Press ENTER pushbutton.

124. Set STRT 1 and 2 switches, on BUFFER Circuit Assembly, to OFF and ALGA switch to ON.

125. Set the VOLTAGE SELECT switch to AGC 13V and using 13V control, slowly increase the voltage (not higher than 16 VDC) until an AGC fail or alarm occurs other than PWR FAIL. Record following voltages: (a) when PWR FAIL occurs and (b) when other alarm or fail occurs (if it does occur). If alarm or fail does not occur record "none" on data sheet. Press ERROR RESET pushbutton. Repeat steps 121, 122 and 123.

126. Lower the voltage using procedure of step 125 (no lower limit). Record following voltage: (a) when PWR FAIL occurs and (b) when other AGC alarms or fails occurs. Press ERROR RESET pushbutton. Repeat steps 121, 122 and 123.

127. Set the VOLTAGE SELECT switch to AGC 3V position and using 3V control, slowly decrease the voltage (not lower than 2VDC) until an AGC fail or alarm occurs other than the PWR FAIL. (Obtain control as stated in step 121.) Record following voltages: (a) when PWR FAIL occurs, and (b) when other alarm or fail occurs (if it does occur).

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If alarm or fail does not occur record "none" on data sheet. Repeat steps 121, 122 and 123.

128. Increase the voltage using procedure of step 127 (until control is lost, but not higher than 3.5 VDC). Record following voltage: (a) when PWR FAIL occurs and (b) when other AGC alarms or fails occur. If alarm or fail does not occur record "none" on data sheet. Press ERROR RESET pushbutton.

129. Using 3V control, adjust until voltmeter indicated 3.0 (±0.1) VDC. (Obtain control as stated in step 121.)

130. Set 3V and 13V switches on POWER CONTROL panel to OFF and STRT 1 and 2 switches on BUFFER Circuit Assembly to ON.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

JDC
NO. 10039
REV. D
INITIAL TDRR 21539

JOB AGC OPERATIONAL TEST

ASSEMBLY UNDER TEST

TITLE ____________
SER. NO. ______ DWG ______ REV. ____

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________ SER. NO. ______ CAL DATE
NAME ____________ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION   APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
55	Frequency	KC	102.3				102.5		
57a	Positive Amplitude	V P-P	5				9		
57b	Pulse Width	μ sec	2.5				3.5		
57c	Zero Shift	V P-P							
57d	Rise Time	μsec	0				0.2		
57e	Negative Amplitude	V P-P	0				8.5		
73a	Amplitude	V P-P	5				9		
73b	Pulse Width	μsec	2				6		
73c	Droop	V P-P	0				1.4		
73d	Rise Time	μ sec	0				0.2		
74	Pulse Delay (Record only when using BLK II CTS)	μ sec	0				1		
76	Pulse delay	μ sec	0				1		
82	DLNK Data, No Pulse Noise, Pos	V Peak	0				+0.4		
	DLNK Data, No. Pulse Noise, Neg	V Peak	0				-6.0		
83	Eng. On, No Pulse Noise	V P-P	0				0.4		

*** TO BE USED AS REQUIRED OR DESIRED**

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 10039
REV. D

JOB AGC OPERATIONAL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
2 thru 14 16 thru 19 26, 28 thru 32, 35, 44, 49, 81, 84, 94, 102, 106, 109, 112, 113, 114, 117	AGC DISPLAYS		All displays responded as required (Record all discrepancies in REMARKS portion of data sheet.)						
125(a)	13 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
(b)	13 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
126(a)	13 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
(b)	13 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
127(a)	3 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
(b)	3 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
128(a)	3 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
(b)	3 Volt Hi Voltage	Volts dc	▨				▨	▨	▨

*** TO BE USED AS REQUIRED OR DESIRED**

REMARKS:

DATE 12 AUG 65

TDRR 2 1 5 3 9 AUG 1 2 1965

JOB AGC OPERATIONAL TEST

JDC 10039 REV. ____ PAGE 1 OF 11

INITIAL TDRR ____ D.S. PGS 2

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION The MAIN PANEL and G & N AGC DSKY alarm displays and alarm circuitry, are verified through routines entered through both DSKY's. The AGC INSTRUCTION words and control pulses are verified as well as AGC-S/C and telemetry interface. All DSKY functions are verified and the ability of the AGC to accept data loaded through the DSKY is checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES Paragraph 3-3.3 of ATP 1026000

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. This JDC utilizes the CTS. See JDC's 10002 and 10004 for cable interconnection and JDC 10007 for CTS switch initialization and turn-on procedure.

NOTE: Insure that DOWNLINK switch on SYSTEM INTERFACE panel is set to DL2 and DOWNLINK ENABLE switch is not lighted.

1. Insure that TRANSFER switch on IMU CONTROL panel is set to MANUAL and COARS ALIGN pushbutton is lighted.

2. Enter (and verify) VERB 05, NOUN 05 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 05-05.

3. Enter (and verify) VERB 50, NOUN 50 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 50-50.

4. Repeat steps 2 and 3 using the MAIN PANEL DSKY.

5. Enter (and verify) VERB 25, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 25-02 (flashing).

6. Enter address 01775_8 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 21-02 (flashing) and row 3 shall indicate 01775.

7. Enter + 88888 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 22-02 (flashing) and row 1 shall indicate + 88888.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ____

JOB AGC OPERATIONAL TEST

JDC 10039 REV PAGE 2 OF 11

SUBSYSTEM G & N SYSTEM

ASSY

8. Enter +88888 into G & N AGC DSKY. Press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 23-02 (flashing) and row 2 shall indicate +88888.

9. Enter +88888 into G & N AGC DSKY. The MAIN PANEL and G & N AGC DSKY VERB-NOUN displays shall indicate 23-02 (flashing) and row 3 shall indicate +88888.

10. Vary BRIGHTNESS CONTROL on MAIN PANEL and G & N AGC DSKY to both limit positions. All AGC DSKY displays shall vary in brightness from off to bright.

11. Press CLEAR pushbuttons on G & N AGC DSKY three times. All rows of the MAIN PANEL and G & N AGC DSKY shall be blank.

12. Repeat steps 5 through 9 and step 11 using the MAIN PANEL DSKY.

13. Enter (and verify) VERB 25, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

14. Enter address 01775_8 into G & N AGC DSKY. Press ENTER pushbutton.

15. Enter +00123 into G & N AGC DSKY, press ENTER pushbutton: enter -00456, press ENTER pushbutton: and enter -00789, press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY shall indicate +00123, -00456, and -00789 in rows 1, 2 and 3 respectively.

16. Enter (and verify) VERB 05. NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01775_8 and press ENTER pushbutton. The MAIN PANEL and G & N AGC DSKY shall indicate 00173, 77067, and 76352 in rows 1, 2 and 3 respectively.

17. Repeat steps 13 through 16 using the MAIN PANEL DSKY.

18. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

19. Enter address 01700_8 into G & N AGC DSKY. Press ENTER pushbutton.

20. Enter 44515 into G & N AGC DSKY. Press ENTER pushbutton.

21. Enter NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.

22. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS
70011	01701
64515	01702
50011	01703
11714	01704
01707	01705
02115	01706
51714	01707
34476	01710

DATE ____

JOB AGC OPERATIONAL TEST

JDC 10039 REV PAGE 3 OF 11

SUBSYSTEM G & N SYSTEM

ASSY

DATA	ADDRESS
10000	01711
01711	01712
01704	01713

23. Enter 00012 into G & N DSKY. Press ENTER pushbutton. Row 3 of AGC DSKY shall indicate 01714.

NOTE: If the requirement of step 23 is not met, repeat steps 18 through 23. An error probably has been made in entering data.

24. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton.

25. Enter 06000_8 into G & N AGC DSKY. Press ENTER pushbutton.

26. Enter VERB 20 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

NOTE: Light indications specified in the following step will go out in less than 10 seconds; observe quickly.

27. Enter address 01700_8 into G & N AGC DSKY. Press ENTER pushbutton. The ACTIVITY COMP lamp shall light on G & N AGC DSKY amd MP DSKY and the T AGC ACT lamp on the System Interface Panel shall light.

28. Enter VERB 22 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

29. Enter 00007_8 into G & N AGC DSKY, press ENTER pushbutton: enter 55675, press ENTER pushbutton. The PROGRAM DISPLAY lamp on MAIN PANEL and G & N AGC DSKY shall light and indicate 88. Press ENTER pushbutton.

30. Enter 00007_8, into G & N AGC DSKY, press ENTER pushbutton; enter 42000_8, press ENTER pushbutton. The UPTEL lamp on the MAIN PANEL and G & N AGC DSKY shall light.

31. Press ENTER pushbutton.

32. Enter address 00007_8 into G & N AGC DSKY. Press ENTER pushbutton.

33. Enter 40000 into G & N AGC DSKY. Press ENTER pushbutton. The UPTEL lamp shall go out.

34. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

35. Enter address 00011_8 into G & N AGC DSKY, press ENTER pushbutton: enter 00025_8, press ENTER pushbutton. The PROGRAM ALARM, CHECK FAIL and KEY RELEASE lamps on the G & N AGC DSKY and COMP FAIL and KEY RELEASE on MP DSKY shall light.

36. Press TEST ALARM pushbutton on G & N AGC DSKY. The RUPTLOCK, PARITY FAIL, TC TRAP, and COUNTER FAIL lamps on the G & N AGC DSKY shall light.

37. Observe the SYSTEM INTERFACE panel of CTS and verify that the following lamps have lighted.

a. T PROG CH
b. T PROG AL
c. T KEY REL
d. T RUPT AL

DATE ____

JOB AGC OPERATIONAL TEST

JDC 10039 REV PAGE 4 OF 11

SUBSYSTEM G & N SYSTEM

ASSY

e. T PAR F
f. T TC TRAP
g. T CNT F

38. Press ERROR RESET pushbutton on MAIN PANEL DSKY. All lamps shall go out except KEY RELEASE on G & N AGC DSKY and KEY RELEASE on MP DSKY.

39. Enter (and verify) VERB 35 into G & N AGC DSKY. Press ENTER pushbutton. KEY RELEASE lamp on G & N AGC DSKY and MP DSKY shall go out.

NOTE: The INSTRUCTION word test will now be initiated. Unsuccessful test is indicated by the PROG. FAIL lamp being on, Verb 01 Noun 31 in Verb Noun display, 01102_8 in row 1 and ACTIVITY COMP light on.

40. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton.

41. Enter VERB 24 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01571_8 and press ENTER pushbutton.

42. Enter 00000_8 into G & N AGC DSKY. Press ENTER pushbutton. Enter 00000_8 again and press ENTER pushbutton.

43. Enter VERB 21, NOUN 27 into G & N AGC DSKY. Press ENTER pushbutton.

44. Enter 10000_8 into G & N AGC DSKY. Press ENTER pushbutton.

45. Enter VERB 14, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

46. Enter 01571_8 into G & N AGC DSKY. Press ENTER pushbutton.

47. The INSTRUCTION word test is complete when R_1 indicates 00000 and R_2 indicates 10000 on G & N AGC DSKY.

48. Enter VERB 34 into G & N AGC DSKY. Press ENTER pushbutton.

49. Enter VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

50. Enter address 01700_8 into G & N AGC DSKY. Press ENTER pushbutton.

51. Enter 31703_8 into G & N AGC DSKY. Press ENTER pushbutton.

52. Enter NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.

53. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS Row 3
50010	01701
02203	01702

54. Enter 55673 into G & N AGC DSKY. Press ENTER pushbutton. Row 3 of G & N AGC DSKY should indicate 01703. If it does not, repeat steps 40 through 45.

DATE ____

55. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 00010$_8$ and press ENTER pushbutton.
56. Enter VERB 10 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700$_8$ and press ENTER pushbutton.
57. The PROGRAM display shall indicate 83 verifying that T3 RUPT has occurred.
58. Enter VERB 31, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.
59. Enter 77777$_8$ into G & N AGC DSKY. Press ENTER pushbutton. The PARITY FAIL lamp shall light.
60. Press ERROR RESET pushbutton.
61. Enter VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
62. Enter 01700$_8$ into G & N AGC DSKY. Press ENTER pushbutton.
63. Repeat step 62.
64. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 04000$_8$ and press ENTER pushbutton.
65. Enter VERB 20 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
66. Enter 01700$_8$ into G & N AGC DSKY. Press ENTER pushbutton. The TC TRAP lamp shall light on the G & N AGC DSKY.
67. Press ERROR RESET pushbutton.
68. Enter VERB 24, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700$_8$ and press ENTER pushbutton.
69. Enter 20017 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700 and press ENTER pushbutton.
70. Enter VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton. Enter 04000$_8$ and press ENTER pushbutton.
71. Enter VERB 20 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton. Enter 01700$_8$ and press ENTER pushbutton. The RUPT LOCK lamp shall light on G & N AGC DSKY. Press ERROR RESET pushbutton.
72. Press SCOPE PROBES 1:1 to light pushbutton and set CHANNEL A-B SELECT to CHAN B DIFF and CHANNEL B selectors to 200 and 20 on SYSTEM INTERFACE panel of CTS.
73. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
74. Enter address 00011$_8$ into G & N AGC DSKY. Press ENTER pushbutton.
75. Enter data 10000$_8$ into G & N AGC DSKY. Press ENTER pushbutton.
76. Set COUNTER switch on SYSTEM INTERFACE panel of CTS to CHAN A and CHAN B and FREQUENCY COUNTER CONTROL as follows:

FUNCTION to FREQ A
FREQ-TIME to KC

DATE ______

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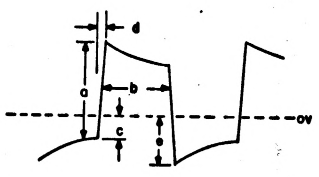
77. Measure and record the frequency. Set the COUNTER switch on SYSTEM INTERFACE panel to OFF.
78. On the OSCILLOSCOPE set the MODE switch to A+B, the Channel A switch to NORM D. C. and the Channel B switch to INVERT D. C. and synchronize the trace on the OSCILLOSCOPE.
79. Measure the following characteristics:
- a. Positive Amplitude. (Neglect overshoot)
- b. Pulse Width at 50% Amplitude.
- c. Zero Shift.
- d. Rise Time at 10-90%.
- e. Negative Amplitude (as referenced to 0 VDC).

Record 1/2 (a) in MAX VALUE column of item 79 (c) on Data Sheet.



NOTE: Insure UPTEL switch is set to BLOCK.

80. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
81. Enter (and verify) address 01273 into G & N AGC DSKY. Press ENTER pushbutton.
82. Enter (and verify) 25252 into G & N AGC DSKY. Press ENTER pushbutton.
83. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton.
84. Enter the following data into G & N AGC DSKY. Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS
25252	1274
25252	1275
25252	1276
25252	1277
25252	1300
25252	1301
25252	1302
25252	1303
25252	1304
25252	1305
25252	1306

85. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

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86. Enter (and verify) address 01327 into G&N AGC DSKY Press ENTER pushbutton.

87. Enter (and verify) 25252 into G&N AGC DSKY. Press ENTER pushbutton.

88 . Enter (and verify) NOUN 15 into G&N AGC DSKY. Press ENTER pushbutton.

89. Enter the following data into G&N AGC DSKY Insure that corresponding address is indicated in R3 of the DSKY. Press ENTER pushbutton twice after each entry. After the second entry, the next sequential address shall appear in R3 of the DSKY.

DATA	ADDRESS
25252	01330
25252	01331
25252	01332
25252	01333
25252	01334
25252	01335
25252	01336
25252	01337
25252	01340
25252	01341
25252	01342

90. Enter (and verify) VERB 25 NOUN 02 into G&N AGC DSKY. Press ENTER pushbutton.

91. Enter (and verify) address 00720 into G&N AGC DSKY. Press ENTER pushbutton.

92. Enter (and verify) data 25252 into G&N AGC DSKY three times. Press ENTER pushbutton after each entry.

93. Set AGC X FORMER Switch to LOW ONE 2, DOWNLINK switch to DL1, press DOWNLINK ENABLE SW to light pushbutton, and press RESET pushbutton. Press ERROR RESET pushbutton on G&N AGC DSKY. TL FAIL, COMP FAIL, and T TEL AL lights shall go out.

94. Set CHANNEL A-B SELECT to CHAN A DIFF, CHANNEL A selectors to 100 and 2, and CHANNEL B selectors to 100 and 1.

95. Synchronize OSCILLOSCOPE waveform and measure the following pulse characteristics;
- a. Amplitude (A)
- b. Width at A/2
- c. Droop at 2.0 μsec
- d. Rise Time at 10-90% A

96. Set CHANNEL A-B SELECT switch to A-B, CHANNEL A selectors to 300 and 7, and CHANNEL B selectors to 100 and 2.

97. Set the MODE switch on OSCILLOSCOPE to ALT and Channel B to NORM DC.

98. Adjust both traces on the OSCILLOSCOPE. and measure and record the delay between the leading edge of CHANNEL A and the leading edge of CHANNEL B traces.

99. Set CHANNEL A- B SELECT to CHAN B DIFF, and CHANNEL A selectors to 100 and 1. Set the EXT SYNC switch of the SYSTEM INTERFACE PANEL to SY-1 position and the triggering SOURCE switch of the OSCILLOSCOPE to EXT position.

100. Set the MODE switch on the OSCILLOSCOPE to A&B, Channel A switch to NORM DC, and the Channel B switch to INVERT DC. Synchronize trace. Establish the mean amplitude of the pulse as "0" vdc on a grid reference line of OSCILLOSCOPE.

DATE ______

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101. Enter (and verify) VERB 21 NOUN 02 into G&N AGC DSKY. Press ENTER pushbutton.

102. Enter address 00011$_8$ into G&N AGC DSKY. Press ENTER pushbutton.

103. Enter data 00000 into G&N AGC DSKY. Press ENTER pushbutton. The TL FAIL lamp on the G&N AGC DSKY and the T TEL AL lamp on the SYSTEM INTERFACE panel shall light. The G&N ERROR condition lamp shall light.

104. Measure and record the peak position and negative no pulse noise level with respect to the "0" vdc reference established in step 100 on the OSCILLOSCOPE.

105. Set CHANNEL B selectors to 200 and 20. Measure and record the peak to peak noise level on the OSCILLOSCOPE.

106. Set the AGC X FORMER switch to NORMAL, DOWNLINK switch to DL2 position and press DOWNLINK ENABLE SW to extinguish pushbutton light. Press ERROR RESET pushbutton. All lamps that lighted in Step 103 shall go out.

107. Insure that TEST MODE switch on the Programmer and Monitor Panel of CTS is set to SYSTEM and that TIMING INHIBIT switch on Logic #2 Drawer is set to OFF.

108. Press TAPE PREPARE mode control switch on the Programmer and Monitor Panel.

109. Set PUNCH switch to ON.

110. Using the "0" and "1" keys on the Programmer and Monitor panel octal keyboard, make a tape by punching the following "0" and "1" groups from left to right from the following table. Provide spacing between the alphabetical rows on the tape by pressing the BUZZ button on the tape punch. This tape should be prepared very carefully to insure a successful test.

a.	110	001	011	101	0001
b.	100	010	111	010	0010
c.	100	001	111	100	0001
d.	111	111	000	001	1111
e.	110	000	011	111	0000
f.	100	010	111	010	0010
g.	111	100	000	111	1100
h.	110	000	011	111	0000
i.	100	001	111	100	0001
j.	100	111	110	000	0111
k.	110	000	011	111	0000
l.	110	000	011	111	0000
m.	111	100	000	111	1100
n.	110	000	011	111	0000
o.	100	001	111	100	0001
p.	100	010	111	010	0010
q.	100	011	111	000	0011
r.	100	100	110	110	0100
s.	111	100	000	111	1100

Press STOP CODE button.

111. Set PUNCH switch to OFF.

DATE ______

112. Remove tape and put tape into TAPE READER.
113. Set READER switch to ON.
114. Press TAPE-UPLINK mode control switch.
115. Set TAPE FREERUN/STEP switch to FREERUN.
116. Set UPTEL switch on MP DSKY to ACCEPT. The ACC UPL lamp on SYSTEM INTERFACE panel shall light. Enter VERB 36 into MP DSKY. Press ENTER pushbutton.
117. Press EXECUTE pushbutton on Programmer and Monitor panel.
118. After tape is finished, set READER switch to OFF.
119. Enter (and verify) VERB 01, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
120. Enter address 01700_8 into G & N AGC DSKY. Press ENTER pushbutton.
121. The G & N AGC DSKY shall display 01234 in register R1.
122. Enter VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
123. Enter address 01700_8 into G & N AGC DSKY. Press ENTER pushbutton. Enter (and verify) 00000 into G & N AGC DSKY. Press ENTER pushbutton.
124. Set UPTEL switch on MP DSKY to BLOCK. The ACC UPL lamp on SYSTEM INTERFACE panel shall go out.
125. Rewind tape and put tape into TAPE READER.
126. Repeat steps 113, 114, and 117 through 120.
127. The G & N AGC DSKY shall display 00000 in register R1.
128. Press KEY RELEASE pushbutton. The UPTL light shall go off.
129. Enter (and verify) VERB 21, NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
130. Enter (and verify) address 00745_8 into G & N AGC DSKY. Press ENTER pushbutton.
131. Enter (and verify) data 43777_8 into G & N AGC DSKY. Press ENTER pushbutton. The following lamps on the SYSTEM INTERFACE panel shall light.
   a. G/N Δ V
   b. CM/SM SEP
   c. G.M.P.C.
   d. G/N ATT
   e. X TRANS
   f. G/N ENTRY
   g. AUTO .05G
   h. TELECOM
   i. C33
   j. G/N FAIL
   k. FDAI-A
132. Enter (and verify) VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
133. Enter (and verify) address 00745_8 into G & N AGC DSKY. Press ENTER pushbutton.

DATE ________

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134. Enter (and verify) data 40000 into G&N AGC DSKY. Press ENTER pushbutton. All lamps shall extinguish that were lighted in step 131.
135. Press DSKY RELAY RETURNS #1 pushbutton. All lamps listed in step 131 shall light on SYSTEM INTERFACE panel. Release pushbutton, all of above lamps shall go out.
136. Press DSKY RELAY RETURNS #2 pushbuttons on SYSTEM INTERFACE panel. All 14 lamps prefixed with T shall light and shall go out when pushbutton is released.
137. Press and light each of following pushbuttons on SYSTEM INTERFACE panel of CTS:
   a. IN2-5 LIFT OFF
   b. IN2-6 GUIDANCE RELEASE
   c. IN2-7 SATURN ULLAGE
   d. IN2-8 S IV B SEPARATE
   e. IN2-9 SM/CM SEPARATE
   f. IN2-13 SCS ΔV MODE
   g. IN2-14 G/N MON MODE
   h. INO-11 G/N ATT CONT MODE
   i. INO-12 G/N ΔV MODE
   j. INO-13 G/N ENTRY MODE
138. Enter (and verify) VERB 01 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.
139. Enter (and verify) address 00004 into G & N AGC DSKY. Press ENTER pushbutton. R_1 shall indicate 16XXX.
140. Press ENTER pushbutton on G & N AGC DSKY. Enter (and verify) 00006 into G & N AGC DSKY. Press ENTER pushbutton. R_3 shall indicate 3X76X or 3X77X.
141. Press all pushbuttons listed in step 137 to insure pushbutton lights go out.
142. Enter (and verify) VERB 21, NOUN 27 into G & N AGC DSKY. Press ENTER pushbutton.
143. Enter (and verify) 70000 into G & N AGC DSKY. Press ENTER pushbutton.
144. Set the AGC VOLTAGE CONTROL 3V and 13V controls on the CTS POWER CONTROL panel to midrange and set the 3V and 13V switches to ON.
145. Set the VOLTAGE SELECT switch to AGC 3V and adjust 3V control for a voltmeter reading of 3.0 (±0.1) VDC. (If control does not vary voltage turn it fully clockwise and then adjust.)
146. Set STRT 1 and 2 switches on BUFFER Circuit Assembly to OFF.
147. Set the VOLTAGE SELECT switch to AGC 13V and using 13V control, slowly increase the voltage (not higher than 16 VDC) until an AGC fail or alarm occurs other than PWR FAIL. Record following voltages: (a) when PWR FAIL occurs and (b) when other alarm or fail occurs (if it does occur). If alarm or fail does not occur record "none" on data sheet. Press ERROR RESET pushbutton.
148. Lower the voltage using procedure of step 147 (no lower limit). Record following voltage: (a) when PWR FAIL occurs and

DATE ________

(b) when other AGC alarms or fails occur. Press ERROR RESET pushbutton.
149. Adjust 13V control, until voltmeter indicates 13.0 (±0.5) VDC.
150. Set the VOLTAGE SELECT switch to AGC 3V position and using 3V control, slowly decrease the voltage (not lower than 2VDC) until an AGC fail or alarm occurs other than the PWR FAIL. Record following voltages: (a) when PWR FAIL occurs, and (b) when other alarm or fail occurs (if it does occur). If alarm or fail does not occur record "none" on data sheet. Press ERROR RESET pushbutton.
151. Increase the voltage using procedure of step 150 (not higher than 3.5 VDC). Record following voltage: (a) when PWR FAIL occurs and (b) when other AGC alarms or fails occur. If alarm or fail does not occur record "none" on data sheet . Press ERROR RESET pushbutton.
152. Using 3V control, adjust until voltmeter indicates 3.0 (±0.1) VDC.
153. Set 3V and 13V switches on POWER CONTROL panel to OFF and STRT 1 and 2 switches on BUFFER Circuit Assembly to ON.

DATE ________

TDRR 21539 AUG 12 1965

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

JDC NO. 10039
REV. ____
INITIAL TDRR ____

JOB AGC OPERATIONAL TEST

ASSEMBLY UNDER TEST
TITLE ____________
SER. NO. ______ DWG ______ REV. ____

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ____________ SER. NO. ______ CAL DATE ______
NAME ____________ SER. NO. ______ CAL DATE ______

CONDUCTED BY ____________ (NAME/AFFILIATION) APPROVED BY ____________ (NAME/AFFILIATION)

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES 1st	2nd*	3rd*	MAX VALUE	REJ	ACC
77	Frequency	KC	102.3				102.5		
79a	Positive Amplitude	V P-P	5				9		
79b	Pulse Width	μ sec	2.5				3.5		
79c	Zero Shift	V P-P							
79d	Rise Time	μ sec	0				0.2		
79e	Negative Amplitude	V P-P	0				8.5		
95a	Amplitude	V P-P	5				9		
95b	Pulse Width	μsec	2				6		
95c	Droop	V P-P	0				1.4		
95d	Rise Time	μsec	0				0.2		
98	Pulse delay	μsec	0				1		
104	DLNK Data, No Pulse Noise, Pos	V Peak	0				+ 0.4		
	DLNK Data, No Pulse Noise, Neg	V Peak	0				- 6.0		
105	Eng. On, No Pulse Noise	V P-P	0				0.4		

* TO BE USED AS REQUIRED OR DESIRED

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 2

JDC
NO. 10039
REV.

JOB AGC OPERATIONAL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
2 thru 12 14 thru 17 27, 29 30, 33 35 thru 39 47, 57 66, 71 103, 106, 116, 124, 128, 131, 134, 135, 136, 139	AGC DISPLAYS		All displays responded as required (Record all discrepancies in REMARKS portion of data sheet.)						
147(a)	13 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
(b)	13 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
148(a)	13 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
(b)	13 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
150(a)	3 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
(b)	3 Volt Lo Voltage	Volts dc	▨				▨	▨	▨
151(a)	3 Volt Hi Voltage	Volts dc	▨				▨	▨	▨
(b)	3 Volt Hi Voltage	Volts dc	▨				▨	▨	▨

*** TO BE USED AS REQUIRED OR DESIRED**

REMARKS:

DATE ________

JOB ZERO OPTICS TEST

JDC 10040 REV. A PAGE 1 OF 4
INITIAL TDRR 21539 D.S. PGS 2

SUBSYSTEM G AND N SYSTEM
ASSY.

DESCRIPTION The test demonstrates optics time to zero and CDU zeroing accuracy. AGC mode indications, telemetry input signals, and PSA front panel test points are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	9-14-65	22432	2-4	2	WK	ACM

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.4.1, 3-3.4.4.4, 3-3.8.1, 3-3.11.2.100 thru 3-3.11.2.103, 3-3.11.2.107, 3-3.11.2.110 thru 3-3.11.2.112, 3-3.11.2.116, 3-3.11.2.117, 3-3.11.2.121 thru 3-3.11.2.124, 3-3.11.3.57, 3-3.3.64 thru 3-3.11.3.67, and 3-3.11.3.73 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, PART III, before proceeding with this JDC.

2. The OSCILLOGRAPH sensitivities called out in this JDC are nominal values. Operator may change sensitivities as required.

3. The range of amplitude for some signals monitored on the OSCILLOGRAPH in this JDC may require that the pen be offset from the normal center line for the zeroing position. The operator may offset pens for zeroing as required.

PROCEDURE

NOTE: The G and N Mounting Fixture shall be set at the 0.0° position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

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1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Set SCOPE "A" INPUT switch to SIG 2 and CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel to 99. Use dc probes to monitor the CDU Trunnion MDA output at 45A9J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

3. Set the CONTROLLER MODE switch on the G and N indicator control panel to DIRECT; the CONTROLLER SPEED switch to HI, and the OPTICS MODE switch to ZERO OPTICS. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

4. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the upper limit not longer than 10 seconds. Release control stick.

5. Use dc probes to monitor the SCT Trunnion MDA output at 45A9J1 pins 13 (high) and 14 (low) on OSCILLOSCOPE.

6. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the lower limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

7. Use dc probes to monitor the CDU Shaft MDA output at 45A9J1 pins 27 (high) and 28 (low) on OSCILLOSCOPE.

8. After ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

9. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the right limit not longer than 10 seconds. Release control stick.

10. Use dc probes to monitor the SCT Shaft MDA output at 45A8J1 pins 35 (high) and 36 (low) on OSCILLOSCOPE.

11. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

12. Insure that Ch 5 DC and CH 6 DC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

13. Set CHANNEL 5, 6, 7 and 8 switches on the OSCILLOGRAPH SIGNAL SELECTOR panel to 7 to monitor the following signal outputs:

a. Trunnion CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 6 (high) and 13 (low) on CHANNEL 5.

b. Trunnion CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 5 (high) and 13 (low) on CHANNEL 6.

DATE ______

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c. Shaft CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 4 (high) and 12 (low) on CHANNEL 7.

d. Shaft CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 3 (high) and 12 (low) on CHANNEL 8.

14. Press CHART SPEEDS 1 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities of CHANNEL's 5 through 8 on the OSCILLOGRAPH AMPLIFIER panel to 20 V/CM.

15. Set the CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC. Using thumbwheels, drive the 2X TRUNNION and SHAFT ANGLE CDU's slowly in the increasing and then decreasing directions until a minimum of three cycles appear on CHANNEL's 5 through 8 of the OSCILLOGRAPH chart.

NOTE: The servo loops will oppose this action.

16. Set the CHART DRIVE switch to OFF and set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF. Record the peak to peak voltage amplitude indicated on CHANNEL's 5 through 8 of OSCILLOGRAPH chart.

17. Insure that CH3 AC, CH4 AC, and CH5 AC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

18. Set CHANNEL 2, 4 and 5 switches to 11 and CHANNEL 3 switch to 13 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signal outputs:

a. SCT Shaft Tach Feedback at 45A8J1 pins 18 (high) and 19 (low) on CHANNEL 2.

b. Shaft CDU Tach Feedback Voltage at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.

c. Trunnion CDU Tach Feedback Voltage at 45A9J1 pins 10 (high) and 11 (low) on CHANNEL 4.

d. SCT Trunnion Tach Feedback Voltage at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

19. Set CONTROLLER SPEED switch on the G and N indicator control panel to HI, and set the OPTICS MODE switch to MANUAL.

20. Using the control stick, drive the optics increasing to the position where the SHAFT ANGLE CDU reads 270.0° and the 2X TRUNNION CDU reads 150.0°.

21. Press CHART SPEEDS 10 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities on the OSCILLOGRAPH AMPLIFIER panel as follows:

a. CHANNEL 2 to 500 MV/MM.

b. CHANNEL 3 to 500 MV/MM.

c. CHANNEL 4 to 500 MV/MM.

d. CHANNEL 5 to 1000 MV/MM.

22. Start OSCILLOGRAPH by setting CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC and note that steady state signals appear on the OSCILLOGRAPH chart.

23. Set OPTICS MODE switch on the G and N indicator control panel to ZERO OPTICS.

DATE ______

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24. When all signals reach steady state values, wait about 5 seconds and set CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER to OFF.

25. Record the elapsed time between the steady state nulls on the OSCILLOGRAPH chart for CHANNELS 2 through 5.

26. Record SHAFT ANGLE CDU and 2X TRUNNION CDU indications.

27. Set CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel as listed below and measure total and in-phase voltage of the following signals on the PAVM:

a. Trunnion CDU 16X Error at 56P9 pins 19 (high) and 56 (low) with CROSSBAR CONTROL set to 208.

b. Shaft CDU 16X Error at 56P9 pins 20 (high) and 56 (low) with CROSSBAR CONTROL set to 112.

28. Enter (and verify) VERB 16, NOUN 55 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. Rows 1 and 2 of the AGC display shall indicate all zeros after the ZERO ENCODER condition lamp goes out.

29. Enter (and verify) VERB 11, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

30. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC mode register 3 in row 1 of DSKY as $-4{-}{-}{-}_8$.

31. Set optics mode switch on G and N indicator control panel to MANUAL. The AGC display row 1 shall indicate $-0{-}{-}{-}_8$.

32. Set OPTICS MODE switch on G and N indicator control panel to COMPUTER. The AGC display indicates the contents of AGC mode register 3 in row 1 as $3{-}{-}{-}{-}_8$ or $7{-}{-}{-}{-}_8$.

33. Enter (and verify) VERB 21, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

34. Enter address 00744 into G and N AGC DSKY. Press ENTER pushbutton.

35. Enter 40001 into G and N AGC DSKY. Press ENTER pushbutton. The ZERO ENCODER condition lamp shall not light.

36. Press KEY RELEASE pushbutton, the AGC display shall indicate the contents of AGC mode register 3 in row 1 as $74{-}{-}{-}_8$ or $34{-}{-}{-}_8$.

37. Set OPTICS MODE switch to ZERO OPTICS.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

JDC
NO. 10040
REV. A
INITIAL TDRR 21539

JOB ZERO OPTICS TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CA. DATE ______
NAME ______ SER. NO. ______ CA. DATE ______

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
4	CDU TRUNNION MDA OUTPUT PSA	V p-p	45				60		
6	SCT TRUNNION MDA OUTPUT PSA	V p-p	5				15		
9	CDU SHAFT MDA OUTPUT PSA	V p-p	45				60		
11	SCT SHAFT MDA OUTPUT PSA	V p-p	10				30		
16	TRUNNION CDU UNCONDITIONED SQ. WAVE $-\Delta\theta$	V p-p	16				22		
	TRUNNION CDU UNCONDITIONED SQ. WAVE $+\Delta\theta$	V p-p	16				22		
	SHAFT CDU UNCONDITIONED SQ. WAVE $-\Delta\theta$	V p-p	16				22		
	SHAFT CDU UNCONDITIONED SQ. WAVE $+\Delta\theta$	V p-p	16				22		
25	SCT SHAFT TIME TO ZERO CH 2	Sec	0				27		

* TO BE USED AS REQUIRED OR DESIRED

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 2

JDC
NO. 10040
REV. A

JOB ZERO OPTICS TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
25 (cont)	CDU SHAFT TIME TO ZERO CH 3	Sec	0				27		
	CDU TRUNNION TIME TO ZERO CH 4	Sec	0				15		
	SCT TRUNNION TIME TO ZERO CH 5	Sec	0				15		
26	SHAFT ANGLE CDU INDICATION	deg	-0.006				+0.006		
	2X TRUNNION CDU INDICATION	deg	-0.006				+0.006		
27	TRUNNION CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	TRUNNION CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
	SHAFT CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	SHAFT CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
28, 30 31, 32 35, 36	DISPLAYS			Indications responded as specified					

* TO BE USED AS REQUIRED OR DESIRED

DATE ______

JOB ZERO OPTICS TEST

JDC 10040 REV. B PAGE 1 OF 4
INITIAL TDRR 21539 D.S. PGS 2

SUBSYSTEM G AND N SYSTEM

ASSY.

DESCRIPTION The test demonstrates optics time to zero and CDU zeroing accuracy. AGC mode indications, telemetry input signals, and PSA front panel test points are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-14-65	22432	2-4	2	WK	ACM
B	9-28-65	22830	All	All	WK	WM

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.4.1, 3-3.4.4.4, 3-3.8.1, 3-3.11.2.100 thru 3-3.11.2.103, 3-3.11.2.107, 3-3.11.2.110 thru 3-3.11.2.112, 3-3.11.2.116, 3-3.11.2.117, 3-3.11.2.121 thru 3-3.11.2.124, 3-3.11.3.57, 3-3.3.64 thru 3-3.11.3.67, and 3-3.11.3.73 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, PART III, before proceeding with this JDC.

2. The OSCILLOGRAPH sensitivities called out in this JDC are nominal values. Operator may change sensitivities as required.

3. The range of amplitude for some signals monitored on the OSCILLOGRAPH in this JDC may require that the pen be offset from the normal center line for the zeroing position. The operator may offset pens for zeroing as required.

PROCEDURE

NOTE: The G and N Mounting Fixture shall be set at the 0.0° position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 AUG 65

JOB ZERO OPTICS TEST

JDC 10040 REV B PAGE 2 OF 4

SUBSYSTEM G AND N SYSTEM

ASSY

1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Set SCOPE "A" INPUT switch to SIG 2 and CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel to 99. Use dc probes to monitor the CDU Trunnion MDA output at 45A9J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

3. Set the CONTROLLER MODE switch on the G and N indicator control panel to DIRECT; the CONTROLLER SPEED switch to HI, and the OPTICS MODE switch to ZERO OPTICS. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

4. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the upper limit not longer than 10 seconds. Release control stick.

5. Use dc probes to monitor the SCT Trunnion MDA output at 45A9J1 pins 13 (high) and 14 (low) on OSCILLOSCOPE.

6. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the lower limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

7. Use dc probes to monitor the CDU Shaft MDA output at 45A9J1 pins 27 (high) and 28 (low) on OSCILLOSCOPE.

8. After ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

9. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the right limit not longer than 10 seconds. Release control stick.

10. Use dc probes to monitor the SCT Shaft MDA output at 45A8J1 pins 35 (high) and 36 (low) on OSCILLOSCOPE.

11. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

12. Insure that Ch 5 DC and CH 6 DC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

13. Set CHANNEL 5, 6, 7 and 8 switches on the OSCILLOGRAPH SIGNAL SELECTOR panel to 7 to monitor the following signal outputs:
   a. Trunnion CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 6 (high) and 13 (low) on CHANNEL 5.
   b. Trunnion CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 5 (high) and 13 (low) on CHANNEL 6.

DATE 12 AUG 65

JOB ZERO OPTICS TEST

JDC 10040 REV B PAGE 3 OF 4

SUBSYSTEM G AND N SYSTEM

ASSY

   c. Shaft CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 4 (high) and 12 (low) on CHANNEL 7.
   d. Shaft CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 3 (high) and 12 (low) on CHANNEL 8.

14. Press CHART SPEEDS 1 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities of CHANNEL's 5 through 8 on the OSCILLOGRAPH AMPLIFIER panel to 20 V/CM.

15. Set the CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC. Using thumbwheels, drive the 2X TRUNNION and SHAFT ANGLE CDU's slowly in the increasing and then decreasing directions until a minimum of three cycles appear on CHANNEL's 5 through 8 of the OSCILLOGRAPH chart.

NOTE: The servo loops will oppose this action.

16. Set the CHART DRIVE switch to OFF and set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF. Record the peak to peak voltage amplitude indicated on CHANNEL's 5 through 8 of OSCILLOGRAPH chart.

17. Insure that CH3 AC, CH4 AC, and CH5 AC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

18. Set CHANNEL 2, 4 and 5 switches to 11 and CHANNEL 3 switch to 13 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signal outputs:
   a. SCT Shaft Tach Feedback at 45A8J1 pins 18 (high) and 19 (low) on CHANNEL 2.
   b. Shaft CDU Tach Feedback Voltage at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.
   c. Trunnion CDU Tach Feedback Voltage at 45A9J1 pins 10 (high) and 11 (low) on CHANNEL 4.
   d. SCT Trunnion Tach Feedback Voltage at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

19. Set CONTROLLER SPEED switch on the G and N indicator control panel to HI, and set the OPTICS MODE switch to MANUAL.

20. Using the control stick, drive the optics increasing to the position where the SHAFT ANGLE CDU reads 270.0° and the 2X TRUNNION CDU reads 150.0°.

21. Press CHART SPEEDS 10 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities on the OSCILLOGRAPH AMPLIFIER panel as follows:
   a. CHANNEL 2 to 500 MV/MM.
   b. CHANNEL 3 to 500 MV/MM.
   c. CHANNEL 4 to 500 MV/MM.
   d. CHANNEL 5 to 1000 MV/MM.

22. Start OSCILLOGRAPH by setting CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC and note that steady state signals appear on the OSCILLOGRAPH chart.

23. Set OPTICS MODE switch on the G and N indicator control panel to ZERO OPTICS.

DATE 12 AUG 65

JOB ZERO OPTICS TEST

JDC 10040 REV B PAGE 4 OF 4

SUBSYSTEM G AND N SYSTEM

ASSY

24. When all signals reach steady state values, wait about 5 seconds and set CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER to OFF.

25. Record the elapsed time between the steady state nulls on the OSCILLOGRAPH chart for CHANNELS 2 through 5.

26. Record SHAFT ANGLE CDU and 2X TRUNNION CDU indications.

27. Set CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel as listed below and measure total and in-phase voltage of the following signals on the PAVM:
   a. Trunnion CDU 16X Error at 56P9 pins 19 (high) and 56 (low) with CROSSBAR CONTROL set to 208.
   b. Shaft CDU 16X Error at 56P9 pins 20 (high) and 56 (low) with CROSSBAR CONTROL set to 112.

28. Enter (and verify) VERB 16, NOUN 55 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. Rows 1 and 2 of the AGC display shall indicate all zeros after the ZERO ENCODER condition lamp goes out.

29. Enter (and verify) VERB 11, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

30. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC mode register 3 in row 1 of DSKY as $-4---_8$.

31. Set optics mode switch on G and N indicator control panel to MANUAL. The AGC display row 1 shall indicate $-0---_8$.

32. Set OPTICS MODE switch on G and N indicator control panel to COMPUTER. The AGC display indicates the contents of AGC mode register 3 in row 1 as $3----_8$ or $7----_8$.

33. Enter (and verify) VERB 21, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

34. Enter address 00744 into G and N AGC DSKY. Press ENTER pushbutton.

35. Enter 40001 into G and N AGC DSKY. Press ENTER pushbutton. The ZERO ENCODER condition lamp shall not light.

36. Press KEY RELEASE pushbutton, the AGC display shall indicate the contents of AGC mode register 3 in row 1 as $7----_8$ or $3----_8$.

37. Set OPTICS MODE switch to ZERO OPTICS.

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

JDC
NO. 10040
REV. B
INITIAL TDRR 21539

JOB ZERO OPTICS TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
4	CDU TRUNNION MDA OUTPUT PSA	V p-p	45				60		
6	SCT TRUNNION MDA OUTPUT PSA	V p-p	5				15		
9	CDU SHAFT MDA OUTPUT PSA	V p-p	45				60		
11	SCT SHAFT MDA OUTPUT PSA	V p-p	10				30		
16	TRUNNION CDU UNCONDITIONED SQ. WAVE - Δθ	V p-p	16				22		
	TRUNNION CDU UNCONDITIONED SQ. WAVE + Δθ	V p-p	16				22		
	SHAFT CDU UNCONDITIONED SQ. WAVE - Δθ	V p-p	16				22		
	SHAFT CDU UNCONDITIONED SQ. WAVE + Δθ	V p-p	16				22		
25	SCT SHAFT TIME TO ZERO CH 2	Sec	0				27		

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 10040
REV. B

JOB ZERO OPTICS TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
25 (cont)	CDU SHAFT TIME TO ZERO CH 3	Sec	0				27		
	CDU TRUNNION TIME TO ZERO CH 4	Sec	0				15		
	SCT TRUNNION TIME TO ZERO CH 5	Sec	0				15		
26	SHAFT ANGLE CDU INDICATION	deg	-0.006				+0.006		
	2X TRUNNION CDU INDICATION	deg	-0.006				+0.006		
27	TRUNNION CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	TRUNNION CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
	SHAFT CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	SHAFT CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
28, 30 31, 32 35, 36	DISPLAYS			Indications responded as specified					

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

JOB ZERO OPTICS TEST | JDC 10040 REV. C PAGE 1 OF 4
INITIAL TDRR 21539 D.S. PGS 2

SUBSYSTEM G AND N SYSTEM | ASSY.

DESCRIPTION The test demonstrates optics time to zero and CDU zeroing accuracy. AGC mode indications, telemetry input signals, and PSA front panel test points are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-14-65	22432	2-4	2	WK	ACM
B	9-28-65	22830	All	All	WK	WM
C	1-12-66	25194	-	1	WK	WM

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.4.1, 3-3.4.4.4, 3-3.8.1, 3-3.11.2.100 thru 3-3.11.2.103, 3-3.11.2.107, 3-3.11.2.110 thru 3-3.11.2.112, 3-3.11.2.116, 3-3.11.2.117, 3-3.11.2.121 thru 3-3.11.2.124, 3-3.11.3.57, 3-3.3.64 thru 3-3.11.3.67, and 3-3.11.3.73 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, PART III, before proceeding with this JDC.

2. The OSCILLOGRAPH sensitivities called out in this JDC are nominal values. Operator may change sensitivities as required.

3. The range of amplitude for some signals monitored on the OSCILLOGRAPH in this JDC may require that the pen be offset from the normal center line for the zeroing position. The operator may offset pens for zeroing as required.

PROCEDURE

NOTE: The G and N Mounting Fixture shall be set at the 0.0° position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 12 AUG 65

JOB ZERO OPTICS TEST | JDC 10040 REV C PAGE 2 OF 4

SUBSYSTEM G AND N SYSTEM | ASSY

1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Set SCOPE "A" INPUT switch to SIG 2 and CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel to 99. Use dc probes to monitor the CDU Trunnion MDA output at 45A9J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

3. Set the CONTROLLER MODE switch on the G and N indicator control panel to DIRECT; the CONTROLLER SPEED switch to HI, and the OPTICS MODE switch to ZERO OPTICS. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

4. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the upper limit not longer than 10 seconds. Release control stick.

5. Use dc probes to monitor the SCT Trunnion MDA output at 45A9J1 pins 13 (high) and 14 (low) on OSCILLOSCOPE.

6. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the lower limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

7. Use dc probes to monitor the CDU Shaft MDA output at 45A9J1 pins 27 (high) and 28 (low) on OSCILLOSCOPE.

8. After ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

9. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the right limit not longer than 10 seconds. Release control stick.

10. Use dc probes to monitor the SCT Shaft MDA output at 45A8J1 pins 35 (high) and 36 (low) on OSCILLOSCOPE.

11. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

12. Insure that Ch 5 DC and CH 6 DC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

13. Set CHANNEL 5, 6, 7 and 8 switches on the OSCILLOGRAPH SIGNAL SELECTOR panel to 7 to monitor the following signal outputs:

a. Trunnion CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 6 (high) and 13 (low) on CHANNEL 5.

b. Trunnion CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 5 (high) and 13 (low) on CHANNEL 6.

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JOB ZERO OPTICS TEST | JDC 10040 REV C PAGE 3 OF 4

SUBSYSTEM G AND N SYSTEM | ASSY

c. Shaft CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 4 (high) and 12 (low) on CHANNEL 7.

d. Shaft CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 3 (high) and 12 (low) on CHANNEL 8.

14. Press CHART SPEEDS 1 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities of CHANNEL's 5 through 8 on the OSCILLOGRAPH AMPLIFIER panel to 20 V/CM.

15. Set the CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC. Using thumbwheels, drive the 2X TRUNNION and SHAFT ANGLE CDU's slowly in the increasing and then decreasing directions until a minimum of three cycles appear on CHANNEL's 5 through 8 of the OSCILLOGRAPH chart.

NOTE: The servo loops will oppose this action.

16. Set the CHART DRIVE switch to OFF and set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF. Record the peak to peak voltage amplitude indicated on CHANNEL's 5 through 8 of OSCILLOGRAPH chart.

17. Insure that CH3 AC, CH4 AC, and CH5 AC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

18. Set CHANNEL 2, 4 and 5 switches to 11 and CHANNEL 3 switch to 13 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signal outputs:

a. SCT Shaft Tach Feedback at 45A8J1 pins 18 (high) and 19 (low) on CHANNEL 2.

b. Shaft CDU Tach Feedback Voltage at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.

c. Trunnion CDU Tach Feedback Voltage at 45A9J1 pins 10 (high) and 11 (low) on CHANNEL 4.

d. SCT Trunnion Tach Feedback Voltage at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

19. Set CONTROLLER SPEED switch on the G and N indicator control panel to HI and set the OPTICS MODE switch to MANUAL.

20. Using the control stick, drive the optics increasing to the position where the SHAFT ANGLE CDU reads 270.0° and the 2X TRUNNION CDU reads 150.0°.

21. Press CHART SPEEDS 10 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities on the OSCILLOGRAPH AMPLIFIER panel as follows:

a. CHANNEL 2 to 500 MV/MM.

b. CHANNEL 3 to 500 MV/MM.

c. CHANNEL 4 to 500 MV/MM.

d. CHANNEL 5 to 1000 MV/MM.

22. Start OSCILLOGRAPH by setting CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC and note that steady state signals appear on the OSCILLOGRAPH chart.

23. Set OPTICS MODE switch on the G and N indicator control panel to ZERO OPTICS.

DATE 12 AUG 65

JOB ZERO OPTICS TEST | JDC 10040 REV C PAGE 4 OF 4

SUBSYSTEM G AND N SYSTEM | ASSY

24. When all signals reach steady state values, wait about 5 seconds and set CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER to OFF.

25. Record the elapsed time between the steady state nulls on the OSCILLOGRAPH chart for CHANNELS 2 through 5.

26. Record SHAFT ANGLE CDU and 2X TRUNNION CDU indications.

27. Set CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel as listed below and measure total and in-phase voltage of the following signals on the PAVM:

a. Trunnion CDU 16X Error at 56P9 pins 19 (high) and 56 (low) with CROSSBAR CONTROL set to 208.

b. Shaft CDU 16X Error at 56P9 pins 20 (high) and 56 (low) with CROSSBAR CONTROL set to 112.

28. Enter (and verify) VERB 16, NOUN 55 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. Rows 1 and 2 of the AGC display shall indicate all zeros after the ZERO ENCODER condition lamp goes out.

29. Enter (and verify) VERB 11, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

30. Enter address 00007$_8$ into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC mode register 3 in row 1 of DSKY as -4---$_8$.

31. Set optics mode switch on G and N indicator control panel to MANUAL. The AGC display row 1 shall indicate -0---$_8$.

32. Set OPTICS MODE switch on G and N indicator control panel to COMPUTER. The AGC display indicates the contents of AGC mode register 3 in row 1 as 3----$_8$ or 7----$_8$.

33. Enter (and verify) VERB 21, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

34. Enter address 00744 into G and N AGC DSKY. Press ENTER pushbutton.

35. Enter 40001 into G and N AGC DSKY. Press ENTER pushbutton. The ZERO ENCODER condition lamp shall not light.

36. Press KEY RELEASE pushbutton, the AGC display shall indicate the contents of AGC mode register 3 in row 1 as 7----$_8$ or 3----$_8$.

37. Set OPTICS MODE switch to ZERO OPTICS.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

JDC
NO. 10040
REV. C
INITIAL TDRR 21539

JOB ZERO OPTICS TEST

ASSEMBLY UNDER TEST TITLE ____ SER. NO. ____ DWG ____ REV. ____	**TEST HISTORY** DATE ____ START ____ END ____ SITE / LOCATION TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ ____ CAL DATE
NAME ____ SER. NO. ____ ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
4	CDU TRUNNION MDA OUTPUT PSA	V p-p	6				60		
6	SCT TRUNNION MDA OUTPUT PSA	V p-p	5				15		
9	CDU SHAFT MDA OUTPUT PSA	V p-p	6				60		
11	SCT SHAFT MDA OUTPUT PSA	V p-p	10				30		
16	TRUNNION CDU UNCONDITIONED SQ. WAVE - Δθ	V p-p	16				22		
	UNNION CDU U CONDITIONED Q. WAVE + Δθ	V p-p	16				22		
	U ONED - Δθ	V p-p	16				22		
	T CDU UNCONDITIONED SQ. WAVE + Δθ	V p-p	16				22		
25	SCT SHAFT TIME TO ZERO CH 2	Sec	0				27		

*** TO BE USED AS REQUIRED OR DESIRED**

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 2

JDC
NO. 10040
REV. C

JOB ZERO OPTICS TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
25 (cont)	CDU SHAFT TIME TO ZERO CH 3	Sec	0				27		
	CDU TRUNNION TIME TO ZERO CH 4	Sec	0				15		
	SCT TRUNNION TIME TO ZERO CH 5	Sec	0				15		
26	SHAFT ANGLE CDU INDICATION	deg	-0.006				+0.006		
	2X TRUNNION CDU INDICATION	deg	-0.006				+0.006		
27	TRUNNION CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	TRUNNION CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
	SHAFT CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	SHAFT CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
28, 30 31, 32 35, 36	DISPLAYS			Indications responded as specified					

*** TO BE USED AS REQUIRED OR DESIRED**

DATE 12 AUG 65

JOB ZERO OPTICS TEST

JDC 10040 **REV.** D **PAGE** 1 **OF** 4

INITIAL TDRR 21539 **D.S. PGS** 2

SUBSYSTEM G AND N SYSTEM

ASSY.

DESCRIPTION The test demonstrates optics time to zero and CDU zeroing accuracy. AGC mode indications, telemetry input signals, and PSA front panel test points are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-14-65	22432	2-4	2	WK	ACM
B	9-28-65	22830	All	All	WK	WM
C	1-12-66	25194	-	1	WK	WM
D	4-14-66	28074	-	1	WK	ACM

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.4.1, 3-3.4.4.4, 3-3.8.1, 3-3.11.2.100 thru 3-3.11.2.103, 3-3.11.2.107, 3-3.11.2.110 thru 3-3.11.2.112, 3-3.11.2.116, 3-3.11.2.117, 3-3.11.2.121 thru 3-3.11.2.124, 3-3.11.3.57, 3-3.3.64 thru 3-3.11.3.67, and 3-3.11.3.73 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, PART III, before proceeding with this JDC.

2. The OSCILLOGRAPH sensitivities called out in this JDC are nominal values. Operator may change sensitivities as required.

3. The range of amplitude for some signals monitored on the OSCILLOGRAPH in this JDC may require that the pen be offset from the normal center line for the zeroing position. The operator may offset pens for zeroing as required.

PROCEDURE

NOTE: The G and N Mounting Fixture shall be set at the 0.0° position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 AUG 65

JOB ZERO OPTICS TEST

JDC 10040 **REV** D **PAGE** 2 **OF** 4

SUBSYSTEM G AND N SYSTEM

ASSY

1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Set SCOPE "A" INPUT switch to SIG 2 and CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel to 99. Use dc probes to monitor the CDU Trunnion MDA output at 45A9J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

3. Set the CONTROLLER MODE switch on the G and N indicator control panel to DIRECT; the CONTROLLER SPEED switch to HI, and the OPTICS MODE switch to ZERO OPTICS. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

4. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the upper limit not longer than 10 seconds. Release control stick.

5. Use dc probes to monitor the SCT Trunnion MDA output at 45A9J1 pins 13 (high) and 14 (low) on OSCILLOSCOPE.

6. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the lower limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

7. Use dc probes to monitor the CDU Shaft MDA output at 45A9J1 pins 27 (high) and 28 (low) on OSCILLOSCOPE.

8. After ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

9. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the right limit not longer than 10 seconds. Release control stick.

10. Use dc probes to monitor the SCT Shaft MDA output at 45A8J1 pins 35 (high) and 36 (low) on OSCILLOSCOPE.

11. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

12. Insure that Ch 5 DC and CH 6 DC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

13. Set CHANNEL 5, 6, 7 and 8 switches on the OSCILLOGRAPH SIGNAL SELECTOR panel to 7 to monitor the following signal outputs:

a. Trunnion CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 6 (high) and 13 (low) on CHANNEL 5.

b. Trunnion CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 5 (high) and 13 (low) on CHANNEL 6.

DATE 12 AUG 65

JOB ZERO OPTICS TEST

JDC 10040 **REV** D **PAGE** 3 **OF** 4

SUBSYSTEM G AND N SYSTEM

ASSY

c. Shaft CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 4 (high) and 12 (low) on CHANNEL 7.

d. Shaft CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 3 (high) and 12 (low) on CHANNEL 8.

14. Press CHART SPEEDS 1 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities of CHANNEL's 5 through 8 on the OSCILLOGRAPH AMPLIFIER panel to 20 V/CM.

15. Set the CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC. Using thumbwheels, drive the 2X TRUNNION and SHAFT ANGLE CDU's slowly in the increasing and then decreasing directions until a minimum of three cycles appear on CHANNEL's 5 through 8 of the OSCILLOGRAPH chart.

NOTE: The servo loops will oppose this action.

16. Set the CHART DRIVE switch to OFF and set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF. Record the peak to peak voltage amplitude indicated on CHANNEL's 5 through 8 of OSCILLOGRAPH chart.

17. Insure that CH3 AC, CH4 AC, and CH5 AC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

18. Set CHANNEL 2, 4 and 5 switches to 11 and CHANNEL 3 switch to 13 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signal outputs:

a. SCT Shaft Tach Feedback at 45A8J1 pins 18 (high) and 19 (low) on CHANNEL 2.

b. Shaft CDU Tach Feedback Voltage at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.

c. Trunnion CDU Tach Feedback Voltage at 45A9J1 pins 10 (high) and 11 (low) on CHANNEL 4.

d. SCT Trunnion Tach Feedback Voltage at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

19. Set CONTROLLER SPEED switch on the G and N indicator control panel to HI, and set the OPTICS MODE switch to MANUAL.

20. Using the control stick, drive the optics increasing to the position where the SHAFT ANGLE CDU reads 270.0° and the 2X TRUNNION CDU reads 150.0°.

21. Press CHART SPEEDS 10 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities on the OSCILLOGRAPH AMPLIFIER panel as follows:

a. CHANNEL 2 to 500 MV/MM.

b. CHANNEL 3 to 500 MV/MM.

c. CHANNEL 4 to 500 MV/MM.

d. CHANNEL 5 to 1000 MV/MM.

22. Start OSCILLOGRAPH by setting CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC and note that steady state signals appear on the OSCILLOGRAPH chart.

23. Set OPTICS MODE switch on the G and N indicator control panel to ZERO OPTICS.

DATE 12 AUG 65

JOB ZERO OPTICS TEST

JDC 10040 **REV** D **PAGE** 4 **OF** 4

SUBSYSTEM G AND N SYSTEM

ASSY

24. When all signals reach steady state values, wait about 5 seconds and set CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER to OFF.

25. Record the elapsed time between the steady state nulls on the OSCILLOGRAPH chart for CHANNELS 2 through 5.

26. Record SHAFT ANGLE CDU and 2X TRUNNION CDU indications.

27. Set CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel as listed below and measure total and in-phase voltage of the following signals on the PAVM:

a. Trunnion CDU 16X Error at 56P9 pins 19 (high) and 56 (low) with CROSSBAR CONTROL set to 208.

b. Shaft CDU 16X Error at 56P9 pins 20 (high) and 56 (low) with CROSSBAR CONTROL set to 112.

28. Enter (and verify) VERB 16, NOUN 55 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. Rows 1 and 2 of the AGC display shall indicate all zeros after the ZERO ENCODER condition lamp goes out.

29. Enter (and verify) VERB 11, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

30. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC mode register 3 in row 1 of DSKY as $-4---_8$.

31. Set optics mode switch on G and N indicator control panel to MANUAL. The AGC display row 1 shall indicate $-0---_8$.

32. Set OPTICS MODE switch on G and N indicator control panel to COMPUTER. The AGC display indicates the contents of AGC mode register 3 in row 1 as $3----_8$ or $7----_8$.

33. Enter (and verify) VERB 21, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

34. Enter address 00744 into G and N AGC DSKY. Press ENTER pushbutton.

35. Enter 40001 into G and N AGC DSKY. Press ENTER pushbutton. The ZERO ENCODER condition lamp shall not light.

36. Press KEY RELEASE pushbutton, the AGC display shall indicate the contents of AGC mode register 3 in row 1 as $7----_8$ or $3----_8$.

37. Set OPTICS MODE switch to ZERO OPTICS.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

JDC
NO. 10040
REV. D
INITIAL TDRR 21539

JOB ZERO OPTICS TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
4	CDU TRUNNION MDA OUTPUT PSA	V p-p	6				▨		
6	SCT TRUNNION MDA OUTPUT PSA	V p-p	5				15		
9	CDU SHAFT MDA OUTPUT PSA	V p-p	6				▨		
11	SCT SHAFT MDA OUTPUT PSA	V p-p	10				30		
16	TRUNNION CDU UNCONDITIONED SQ. WAVE -Δθ	V p-p	16				22		
	TRUNNION CDU UNCONDITIONED SQ. WAVE +Δθ	V p-p	16				22		
	SHAFT CDU UNCONDITIONED SQ. WAVE -Δθ	V p-p	16				22		
	SHAFT CDU UNCONDITIONED SQ. WAVE +Δθ	V p-p	16				22		
25	SCT SHAFT TIME TO ZERO CH 2	Sec	0				27		

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 2

JDC
NO. 10040
REV. D

JOB ZERO OPTICS TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
25 (cont)	CDU SHAFT TIME TO ZERO CH 3	Sec	0				27		
	CDU TRUNNION TIME TO ZERO CH 4	Sec	0				15		
	SCT TRUNNION TIME TO ZERO CH 5	Sec	0				15		
26	SHAFT ANGLE CDU INDICATION	deg	-0.006				+0.006		
	2X TRUNNION CDU INDICATION	deg	-0.006				+0.006		
27	TRUNNION CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	TRUNNION CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
	SHAFT CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	SHAFT CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
28, 30 31, 32 35, 36	DISPLAYS			Indications responded as specified					

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

JOB ZERO OPTICS TEST | JDC 10040 REV. E PAGE 1 OF 4
INITIAL TDRR 21539 D.S. PGS 2

SUBSYSTEM G AND N SYSTEM | ASSY.

DESCRIPTION The test demonstrates optics time to zero and CDU zeroing accuracy. AGC mode indications, telemetry input signals, and PSA front panel test points are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	9-14-65	22432	2-4	2	WK	ACM
B	9-28-65	22830	All	All	WK	WM
C	1-12-66	25194	-	1	WK	WM
D	4-14-66	28074	-	1	WK	ACM
E	6-7-66	29397	2	-	MM	-

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.4.1, 3-3.4.4.4, 3-3.8.1, 3-3.11.2.100 thru 3-3.11.2.103, 3-3.11.2.107, 3-3.11.2.110 thru 3-3.11.2.112, 3-3.11.2.116, 3-3.11.2.117, 3-3.11.2.121 thru 3-3.11.2.124, 3-3.11.3.57, 3-3.3.64 thru 3-3.11.3.67, and 3-3.11.3.73 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, PART III, before proceeding with this JDC.

2. The OSCILLOGRAPH sensitivities called out in this JDC are nominal values. Operator may change sensitivities as required.

3. The range of amplitude for some signals monitored on the OSCILLOGRAPH in this JDC may require that the pen be offset from the normal center line for the zeroing position. The operator may offset pens for zeroing as required.

PROCEDURE

NOTE: The G and N Mounting Fixture shall be set at the 0.0° position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 12 AUG 65

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1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Set SCOPE "A" INPUT switch to SIG 2 and CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel to 99. Use dc probes to monitor the CDU Trunnion MDA output at 45A9J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

3. Set the CONTROLLER MODE switch on the G and N indicator control panel to DIRECT; the CONTROLLER SPEED switch to HI, and the OPTICS MODE switch to ZERO OPTICS. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

4. Measure and record the steady state peak to peak voltage indicated on the OSCILLOSCOPE, after the initial acceleration transient, while holding the control stick to the upper limit not longer than 10 seconds. Release control stick.

5. Use dc probes to monitor the SCT Trunnion MDA output at 45A9J1 pins 13 (high) and 14 (low) on OSCILLOSCOPE.

6. Measure and record the steady state peak to peak voltage indicated on the OSCILLOSCOPE, after the initial acceleration transient, while holding the control stick to the lower limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

7. Use dc probes to monitor the CDU Shaft MDA output at 45A9J1 pins 27 (high) and 28 (low) on OSCILLOSCOPE.

8. After ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

9. Measure and record the steady state peak to peak voltage indicated on the OSCILLOSCOPE, after the initial acceleration transient, while holding the control stick to the right limit not longer than 10 seconds. Release control stick.

10. Use dc probes to monitor the SCT Shaft MDA output at 45A8J1 pins 35 (high) and 36 (low) on OSCILLOSCOPE.

11. Measure and record the steady state peak to peak voltage indicated on the OSCILLOSCOPE, after the initial acceleration transient, while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

12. Insure that Ch 5 DC and CH 6 DC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

13. Set CHANNEL 5, 6, 7 and 8 switches on the OSCILLOGRAPH SIGNAL SELECTOR panel to 7 to monitor the following signal outputs:

a. Trunnion CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 6 (high) and 13 (low) on CHANNEL 5.

b. Trunnion CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 5 (high) and 13 (low) on CHANNEL 6.

DATE 12 AUG 65

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c. Shaft CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 4 (high) and 12 (low) on CHANNEL 7.

d. Shaft CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 3 (high) and 12 (low) on CHANNEL 8.

14. Press CHART SPEEDS 1 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities of CHANNEL's 5 through 8 on the OSCILLOGRAPH AMPLIFIER panel to 20 V/CM.

15. Set the CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC. Using thumbwheels, drive the 2X TRUNNION and SHAFT ANGLE CDU's slowly in the increasing and then decreasing directions until a minimum of three cycles appear on CHANNEL's 5 through 8 of the OSCILLOGRAPH chart.

NOTE: The servo loops will oppose this action.

16. Set the CHART DRIVE switch to OFF and set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF. Record the peak to peak voltage amplitude indicated on CHANNEL's 5 through 8 of OSCILLOGRAPH chart.

17. Insure that CH3 AC, CH4 AC, and CH5 AC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

18. Set CHANNEL 2, 4 and 5 switches to 11 and CHANNEL 3 switch to 13 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signal outputs:

a. SCT Shaft Tach Feedback at 45A8J1 pins 18 (high) and 19 (low) on CHANNEL 2.

b. Shaft CDU Tach Feedback Voltage at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.

c. Trunnion CDU Tach Feedback Voltage at 45A9J1 pins 10 (high) and 11 (low) on CHANNEL 4.

d. SCT Trunnion Tach Feedback Voltage at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

19. Set CONTROLLER SPEED switch on the G and N indicator control panel to HI, and set the OPTICS MODE switch to MANUAL.

20. Using the control stick, drive the optics increasing to the position where the SHAFT ANGLE CDU reads 270.0° and the 2X TRUNNION CDU reads 150.0°.

21. Press CHART SPEEDS 10 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities on the OSCILLOGRAPH AMPLIFIER panel as follows:

a. CHANNEL 2 to 500 MV/MM.

b. CHANNEL 3 to 500 MV/MM.

c. CHANNEL 4 to 500 MV/MM.

d. CHANNEL 5 to 1000 MV/MM.

22. Start OSCILLOGRAPH by setting CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC and note that steady state signals appear on the OSCILLOGRAPH chart.

23. Set OPTICS MODE switch on the G and N indicator control panel to ZERO OPTICS.

DATE 12 AUG 65

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24. When all signals reach steady state values, wait about 5 seconds and set CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER to OFF.

25. Record the elapsed time between the steady state nulls on the OSCILLOGRAPH chart for CHANNELS 2 through 5.

26. Record SHAFT ANGLE CDU and 2X TRUNNION CDU indications.

27. Set CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel as listed below and measure total and in-phase voltage of the following signals on the PAVM:

a. Trunnion CDU 16X Error at 56P9 pins 19 (high) and 56 (low) with CROSSBAR CONTROL set to 208.

b. Shaft CDU 16X Error at 56P9 pins 20 (high) and 56 (low) with CROSSBAR CONTROL set to 112.

28. Enter (and verify) VERB 16, NOUN 55 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. Rows 1 and 2 of the AGC display shall indicate all zeros after the ZERO ENCODER condition lamp goes out.

29. Enter (and verify) VERB 11, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

30. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC mode register 3 in row 1 of DSKY as $-4---_8$.

31. Set optics mode switch on G and N indicator control panel to MANUAL. The AGC display row 1 shall indicate $-0---_8$.

32. Set OPTICS MODE switch on G and N indicator control panel to COMPUTER. The AGC display indicates the contents of AGC mode register 3 in row 1 as $3----_8$ or $7----_8$.

33. Enter (and verify) VERB 21, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

34. Enter address 00744 into G and N AGC DSKY. Press ENTER pushbutton.

35. Enter 40001 into G and N AGC DSKY. Press ENTER pushbutton. The ZERO ENCODER condition lamp shall not light.

36. Press KEY RELEASE pushbutton, the AGC display shall indicate the contents of AGC mode register 3 in row 1 as $7----_8$ or $3----_8$.

37. Set OPTICS MODE switch to ZERO OPTICS.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

JDC
NO. 10040
REV. E
INITIAL TDRR 21539

JOB ZERO OPTICS TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
4	CDU TRUNNION MDA OUTPUT PSA	V p-p	6				▨		
6	SCT TRUNNION MDA OUTPUT PSA	V p-p	5				15		
9	CDU SHAFT MDA OUTPUT PSA	V p-p	6				▨		
11	SCT SHAFT MDA OUTPUT PSA	V p-p	10				30		
16	TRUNNION CDU UNCONDITIONED SQ. WAVE - Δθ	V p-p	16				22		
	TRUNNION CDU UNCONDITIONED SQ. WAVE + Δθ	V p-p	16				22		
	SHAFT CDU UNCONDITIONED SQ. WAVE - Δθ	V p-p	16				22		
	SHAFT CDU UNCONDITIONED SQ. WAVE + Δθ	V p-p	16				22		
25	SCT SHAFT TIME TO ZERO CH 2	Sec	0				27		

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 2

JDC
NO. 10040
REV. E

JOB ZERO OPTICS TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
25 (cont)	CDU SHAFT TIME TO ZERO CH 3	Sec	0				27		
	CDU TRUNNION TIME TO ZERO CH 4	Sec	0				15		
	SCT TRUNNION TIME TO ZERO CH 5	Sec	0				15		
26	SHAFT ANGLE CDU INDICATION	deg	-0.006				+0.006		
	2X TRUNNION CDU INDICATION	deg	-0.006				+0.006		
27	TRUNNION CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	TRUNNION CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
	SHAFT CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	SHAFT CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
28, 30 31, 32 35, 36	DISPLAYS			Indications responded as specified					

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

JOB ZERO OPTICS TEST | JDC 10040 REV. F PAGE 1 OF 4
INITIAL TDRR 21539 D.S. PGS 2

SUBSYSTEM G AND N SYSTEM | ASSY.

DESCRIPTION The test demonstrates optics time to zero and CDU zeroing accuracy. AGC mode indications, telemetry input signals, and PSA front panel test points are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-14-65	22432	2-4	2	WK	ACM
B	9-28-65	22830	All	All	WK	WM
C	1-12-66	25194	-	1	WK	WM
D	4-14-66	28074	-	1	WK	ACM
E	6-7-66	29397	2	-	MM	-
F	6-30-67	34072	2, 3, 4		EA	-

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.4.1, 3-3.4.4.4, 3-3.8.1, 3-3.11.2.100 thru 3-3.11.2.103, 3-3.11.2.107, 3-3.11.2.110 thru 3-3.11.2.112, 3-3.11.2.116, 3-3.11.2.117, 3-3.11.2.121 thru 3-3.11.2.124, 3-3.11.3.57, 3-3.3.64 thru 3-3.11.3.67, and 3-3.11.3.73 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, PART III, before proceeding with this JDC.

2. The OSCILLOGRAPH sensitivities called out in this JDC are nominal values. Operator may change sensitivities as required.

3. The range of amplitude for some signals monitored on the OSCILLOGRAPH in this JDC may require that the pen be offset from the normal center line for the zeroing position. The operator may offset pens for zeroing as required.

PROCEDURE

NOTE: The G and N Mounting Fixture shall be set at the 0.0° position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

---

1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Set SCOPE "A" INPUT switch to SIG 2 and CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel to 99. Use dc probes to monitor the CDU Trunnion MDA output at 45A9J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

3. Set the CONTROLLER MODE switch on the G and N indicator control panel to DIRECT; the CONTROLLER SPEED switch to HI, and the OPTICS MODE switch to ZERO OPTICS. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

4. Measure and record the steady state peak to peak voltage indicated on the OSCILLOSCOPE, after the initial acceleration transient, while holding the control stick to the upper limit not longer than 10 seconds. Release control stick.

5. Use dc probes to monitor the SCT Trunnion MDA output at 45A9J1 pins 13 (high) and 14 (low) on OSCILLOSCOPE.

6. Measure and record the steady state peak to peak voltage indicated on the OSCILLOSCOPE, after the initial acceleration transient, while holding the control stick to the lower limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

7. Use dc probes to monitor the CDU Shaft MDA output at 45A9J1 pins 27 (high) and 28 (low) on OSCILLOSCOPE.

8. After ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

9. Measure and record the steady state peak to peak voltage indicated on the OSCILLOSCOPE, after the initial acceleration transient, while holding the control stick to the right limit not longer than 10 seconds. Release control stick.

10. Use dc probes to monitor the SCT Shaft MDA output at 45A8J1 pins 35 (high) and 36 (low) on OSCILLOSCOPE.

11. Measure and record the steady state peak to peak voltage indicated on the OSCILLOSCOPE, after the initial acceleration transient, while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

12. Insure that CH 5 DC and CH 6 DC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

13. Set CHANNEL 5, 6, 7 and 8 switches on the OSCILLOGRAPH SIGNAL SELECTOR panel to 7 to monitor the following signal outputs:

a. Trunnion CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 6 (high) and 13 (low) on CHANNEL 5.

b. Trunnion CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 5 (high) and 13 (low) on CHANNEL 6.

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c. Shaft CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 4 (high) and 12 (low) on CHANNEL 7.

d. Shaft CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 3 (high) and 12 (low) on CHANNEL 8.

14. Press CHART SPEEDS 1 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities of CHANNEL's 5 through 8 on the OSCILLOGRAPH AMPLIFIER panel to 20 V/CM.

15. Set the CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC. Using thumbwheels, drive the 2X TRUNNION and SHAFT ANGLE CDU's slowly in the increasing and then decreasing directions until a minimum of three cycles appear on CHANNEL's 5 through 8 of the OSCILLOGRAPH chart.

NOTE: The servo loops will oppose this action.

16. Set the CHART DRIVE switch to OFF and set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF. Record the peak to peak voltage amplitude indicated on CHANNEL's 5 through 8 of OSCILLOGRAPH chart.

NOTE: Do not perform steps 17 through 26 if OUA has had ECP-555 incorporated.

17. Insure that CH3 AC, CH4 AC, and CH5 AC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

18. Set CHANNEL 2, 4 and 5 switches to 11 and CHANNEL 3 switch to 13 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signal outputs:

a. SCT Shaft Tach Feedback at 45A8J1 pins 18 (high) and 19 (low) on CHANNEL 2.

b. Shaft CDU Tach Feedback Voltage at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.

c. Trunnion CDU Tach Feedback Voltage at 45A9J1 pins 10 (high) and 11 (low) on CHANNEL 4.

d. SCT Trunnion Tach Feedback Voltage at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

19. Set CONTROLLER SPEED switch on the G and N indicator control panel to HI, and set the OPTICS MODE switch to MANUAL.

20. Using the control stick, drive the optics increasing to the position where the SHAFT ANGLE CDU reads 270.0° and the 2X TRUNNION CDU reads 150.0°.

21. Press CHART SPEEDS 10 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities on the OSCILLOGRAPH AMPLIFIER panel as follows:

a. CHANNEL 2 to 500 MV/MM.

b. CHANNEL 3 to 500 MV/MM.

c. CHANNEL 4 to 500 MV/MM.

d. CHANNEL 5 to 1000 MV/MM.

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22. Start OSCILLOGRAPH by setting CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC and note that steady state signals appear on the OSCILLOGRAPH chart.

23. Set OPTICS MODE switch on the G and N indicator control panel to ZERO OPTICS.

24. When all signals reach steady state values, wait about 5 seconds and set CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER to OFF.

25. Record the elapsed time between the steady state nulls on the OSCILLOGRAPH chart for CHANNELS 2 through 5.

26. Record SHAFT ANGLE CDU and 2X TRUNNION CDU indications.

27. Set CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel as listed below and measure and record total and in-phase voltage of the following signals on the PAVM:

a. Trunnion CDU 16X Error at 56P9 pins 19 (high) and 56 (low) with CROSSBAR CONTROL set to 206.

b. Shaft CDU 16X Error at 56P9 pins 20 (high) and 56 (low) with CROSSBAR CONTROL set to 112.

28. Enter (and verify) VERB 16, NOUN 55 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. Rows 1 and 2 of the AGC display shall indicate all zeros after the ZERO ENCODER condition lamp goes out.

29. Enter (and verify) VERB 11, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

30. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC mode register 3 in row 1 of DSKY as $-4---_8$.

31. Set optics mode switch on G and N indicator control panel to MANUAL. The AGC display row 1 shall indicate $-0--_8$.

32. Set OPTICS MODE switch on G and N indicator control panel to COMPUTER. The AGC display indicates the contents of AGC mode register 3 in row 1 as $3----_8$ or $7---_8$.

33. Enter (and verify) VERB 21, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

34. Enter address 00744 into G and N AGC DSKY. Press ENTER pushbutton.

35. Enter 40001 into G and N AGC DSKY. Press ENTER pushbutton. The ZERO ENCODER condition lamp shall not light.

36. Press KEY RLSE pushbutton, the AGC display shall indicate the contents of AGC mode register 3 in row 1 as $7----_8$ or $3----_8$.

37. Set OPTICS MODE switch to ZERO OPTICS.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

NO. 10040 **JDC**
REV. F
INITIAL TDRR 21559

JOB ZERO OPTICS TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ **DWG** ______ **REV.** ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ **SER. NO.** ______ CAL DATE ______

NAME ______ **SER. NO.** ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION **APPROVED BY** ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
4	CDU TRUNNION MDA OUTPUT PSA	V p-p	6				▨		
6	SCT TRUNNION MDA OUTPUT PSA	V p-p	5				15		
9	CDU SHAFT MDA OUTPUT PSA	V p-p	6				▨		
11	SCT SHAFT MDA OUTPUT PSA	V p-p	10				30		
16	TRUNNION CDU UNCONDITIONED SQ. WAVE - Δθ	V p-p	16				22		
	TRUNNION CDU UNCONDITIONED SQ. WAVE + Δθ	V p-p	16				22		
	SHAFT CDU UNCONDITIONED SQ. WAVE - Δθ	V p-p	16				22		
	SHAFT CDU UNCONDITIONED SQ. WAVE + Δθ	V p-p	16				22		
25	SCT SHAFT TIME TO ZERO CH 2	Sec	0				27		

*** TO BE USED AS REQUIRED OR DESIRED**

DATE 12 AUG 65

FORM 00149
Chg. 7-2[illegible]-65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 2

JDC
NO. 10040
REV. F

JOB ZERO OPTICS TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
25 (cont)	CDU SHAFT TIME TO ZERO CH 3	Sec	0				27		
	CDU TRUNNION TIME TO ZERO CH 4	Sec	0				15		
	SCT TRUNNION TIME TO ZERO CH 5	Sec	0				15		
26	SHAFT ANGLE CDU INDICATION	deg	-0.006				+0.006		
	2X TRUNNION CDU INDICATION	deg	-0.006				+0.006		
27	TRUNNION CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	TRUNNION CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
	SHAFT CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	SHAFT CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
28, 30 31, 32 35, 36	DISPLAYS			Indications responded as specified					

*** TO BE USED AS REQUIRED OR DESIRED**

DATE 12 AUG 65

FORM 00150
Chg. 7-2[illegible]-65

TDRR 21539 AUG 12 1965

JOB ZERO OPTICS TEST

JDC 10040 REV. - PAGE 1 OF 4

INITIAL TDRR - D.S. PGS 2

SUBSYSTEM G AND N SYSTEM

ASSY.

DESCRIPTION The test demonstrates optics time to zero and CDU zeroing accuracy. AGC mode indications, telemetry input signals, and PSA front panel test points are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.4.1, 3-3.4.4.4, 3-3.8.1, 3-3.11.2.100 thru 3-3.11.2.103, 3-3.11.2.107, 3-3.11.2.110 thru 3-3.11.2.112, 3-3.11.2.116, 3-3.11.2.117, 3-3.11.2.121 thru 3-3.11.2.124, 3-3.11.3.57, 3-3.3.64 thru 3-3.11.3.67, and 3-3.11.3.73 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, PART III, before proceeding with this JDC.

2. The OSCILLOGRAPH sensitivities called out in this JDC are nominal values. Operator may change sensitivities as required.

3. The range of amplitude for some signals monitored on the OSCILLOGRAPH in this JDC may require that the pen be offset from the normal center line for the zeroing position. The operator may offset pens for zeroing as required.

PROCEDURE

NOTE: The G and N Mounting Fixture shall be set at the 0.0° position.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB ZERO OPTICS TEST

JDC 10040 REV - PAGE 2 OF 4

SUBSYSTEM G AND N SYSTEM

ASSY

1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Set SLOPE "A" INPUT switch to SIG 2 and CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel to 99. Use dc probes to monitor the CDU Trunnion MDA output at 45A9J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

3. Set the CONTROLLER MODE switch on the G and N indicator control panel to DIRECT; the CONTROLLER SPEED switch to HI and the OPTICS MODE switch to ZERO OPTICS. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

4. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the upper limit not longer than 10 seconds. Release control stick.

5. Use dc probes to monitor the SCT Trunnion MDA output at 45A9J1 pins 13 (high) and 14 (low) on OSCILLOSCOPE.

6. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the lower limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

7. Use dc probes to monitor the CDU Shaft MDA output at 45A9J1 pins 27 (high) and 28 (low) on OSCILLOSCOPE.

8. After ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

9. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the right limit not longer than 10 seconds. Release control stick.

10. Use dc probes to monitor the SCT Shaft MDA output at 45A8J1 pins 35 (high) and 36 (low) on OSCILLOSCOPE.

11. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch on G and N indicator control panel to ZERO OPTICS.

12. Insure that CH 5 DC and CH 6 DC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

13. Set CHANNEL 5, 6, 7 and 8 switches on the OSCILLOGRAPH SIGNAL SELECTOR panel to 7 to monitor the following signal outputs:

   a. Trunnion CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 6 (high) and 13 (low) on CHANNEL 5.

   b. Trunnion CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 5 (high) and 13 (low) on CHANNEL 6.

DATE ______

JOB ZERO OPTICS TEST

JDC 10040 REV - PAGE 3 OF 4

SUBSYSTEM G AND N SYSTEM

ASSY

   c. Shaft CDU Unconditioned Square Wave $-\Delta\theta$ at 45A7J1 pins 4 (high) and 12 (low) on CHANNEL 7.

   d. Shaft CDU Unconditioned Square Wave $+\Delta\theta$ at 45A7J1 pins 3 (high) and 12 (low) on CHANNEL 8.

14. Press CHART SPEEDS 1 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities of CHANNEL's 5 through 8 on the OSCILLOGRAPH AMPLIFIER panel to 20 V/CM.

15. Set the CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC. Using thumbwheels, drive the 2X TRUNNION and SHAFT ANGLE CDU's slowly in the increasing and then decreasing directions until a minimum of three cycles appear on CHANNEL's 5 through 8 of the OSCILLOGRAPH chart.

   NOTE: The servo loops will oppose this action.

16. Set the CHART DRIVE switch to OFF and set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF. Record the peak to peak voltage amplitude indicated on CHANNEL's 5 through 8 of OSCILLOGRAPH CHART.

17. Insure that CH3 AC, CH4 AC, and CH5 AC pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

18. Set CHANNEL 2, 4 and 5 switches to 11 and CHANNEL 3 switch to 13 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signal outputs:

   a. SCT Shaft Tach Feedback at 45A8J1 pins 18 (high) and 19 (low) on CHANNEL 2.

   b. Shaft CDU Tach Feedback Voltage at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.

   c. Trunnion CDU Tach Feedback Voltage at 45A9J1 pins 10 (high) and 11 (low) on CHANNEL 4.

   d. SCT Trunnion Tach Feedback Voltage at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

19. Set CONTROLLER SPEED switch on the G and N indicator control panel to HI, and set the OPTICS MODE switch to MANUAL.

20. Using the control stick, drive the optics increasing to the position where the SHAFT ANGLE CDU reads 270.0° and the 2X TRUNNION CDU reads 150.0°.

21. Press CHART SPEEDS 10 pushbutton on the OSCILLOGRAPH CONTROL panel and set sensitivities on the OSCILLOGRAPH AMPLIFIER panel as follows:

   a. CHANNEL 2 to 500 MV/MM.

   b. CHANNEL 3 to 500 MV/MM.

   c. CHANNEL 4 to 500 MV/MM.

   d. CHANNEL 5 to 1000 MV/MM.

22. Start OSCILLOGRAPH by setting CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC and note that steady state signals appear on the OSCILLOGRAPH chart.

DATE ______

JOB ZERO OPTICS TEST

JDC 10040 REV - PAGE 4 OF 4

SUBSYSTEM G AND N SYSTEM

ASSY

23. Set OPTICS MODE switch on the G and N indicator control panel to ZERO OPTICS.

24. When all signals reach steady state values, wait about 5 seconds and set CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER to OFF.

25. Record the elapsed time between the steady state nulls on the OSCILLOGRAPH chart for CHANNELS 2 through 5.

26. Record SHAFT ANGLE CDU and 2X TRUNNION CDU indications.

27. Set CROSSBAR CONTROL on the PRIMARY SIGNAL SELECTOR panel as listed below and measure total and in-phase voltage of the following signals on the PAVM:

   a. Trunnion CDU 16X Error at 56P9 pins 19 (high) and 56 (low) with CROSSBAR CONTROL set to 208.

   b. Shaft CDU 16X Error at 56P9 pins 20 (high) and 56 (low) with CROSSBAR CONTROL set to 112.

28. Enter (and verify) VERB 16, NOUN 55 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. Rows 1 and 2 of the AGC display shall indicate all zeros after the ZERO ENCODER condition lamp goes out.

29. Enter (and verify) VERB 11, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

30. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC mode register 3 in row 1 of DSKY as $-4---_8$.

31. Set optics mode switch on G and N indicator control panel to MANUAL. The AGC display row 1 shall indicate $-0---_8$.

32. Set OPTICS MODE switch on G and N indicator control panel to COMPUTER. The AGC display indicates the contents of AGC mode register 3 in row 1 as $3----_8$ or $7----_8$.

33. Enter (and verify) VERB 21, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton.

34. Enter address 00744 into G and N AGC DSKY. Press ENTER pushbutton.

35. Enter 40001 into G and N AGC DSKY. Press ENTER pushbutton. The ZERO ENCODER condition lamp shall not light.

36. Press KEY RELEASE pushbutton, the AGC display shall indicate the contents of AGC mode register 3 in row 1 as $7----_8$ or $3----_8$.

37. Set OPTICS MODE switch to ZERO OPTICS.

DATE ______

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

JDC
NO. 10040
REV. -
INITIAL TDRR -

JOB ZERO OPTICS TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ **DWG** ______ **REV.** ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ **SER. NO.** ______ CAL DATE
NAME ______ **SER. NO.** ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION **APPROVED BY** ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
4	CDU TRUNNION MDA OUTPUT PSA	V p-p	45				60		
6	SCT TRUNNION MDA OUTPUT PSA	V p-p	5				15		
9	CDU SHAFT MDA OUTPUT PSA	V p-p	45				60		
11	SCT SHAFT MDA OUTPUT PSA	V p-p	10				30		
16	TRUNNION CDU UNCONDITIONED SQ. WAVE $-\Delta\theta$	V p-p	16				22		
	TRUNNION CDU UNCONDITIONED SQ. WAVE $+\Delta\theta$	V p-p	16				22		
	SHAFT CDU UNCONDITIONED SQ. WAVE $-\Delta\theta$	V p-p	16				22		
	SHAFT CDU UNCONDITIONED SQ. WAVE $+\Delta\theta$	V p-p	16				22		
25	SCT SHAFT TIME TO ZERO CH 2	Sec	0				27		
	CDU SHAFT TIME TO ZERO CH 3	Sec	0				27		

*** TO BE USED AS REQUIRED OR DESIRED**

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 2

JDC
NO. 10040
REV. -

JOB ZERO OPTICS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
25	CDU TRUNNION TIME TO ZERO CH 4	Sec	0				15		
	SCT TRUNNION TIME TO ZERO CH 5	Sec	0				15		
26	TRUNNION CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	TRUNNION CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
	SHAFT CDU 16X RSVR TOTAL NULL	V rms	0.0				0.028		
	SHAFT CDU 16X RSVR IN PHASE NULL	V rms	0.0				0.005		
28,30 31,32 35,36	DISPLAYS			Indications responded as specified					

*** TO BE USED AS REQUIRED OR DESIRED**

DATE ______

JOB OPTICS SLEW RATE TEST

JDC 10041 **REV.** A **PAGE** 1 **OF** 6

INITIAL TDRR 21539 **D.S. PGS** 3

SUBSYSTEM G AND N SYSTEM

ASSY.

DESCRIPTION The test demonstrates slewing performance of the optics servo loops.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	10-1-65	22857	All	All	WKd	ACM

REFERENCES	See below.
IMPORTANT	See below.
INTERVAL	
TOOLS AND MATERIAL	Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.8.3, 3-3.11.2.104 thru 3-3.11.2.106, 3-3.11.2.108, 3-3.11.2.109, 3-3.11.2.118 thru 3-3.11.2.120, 3-3.11.3.53, 3-3.11.3.54, 3-3.11.3.58, 3-3.11.3.64, 3-3.11.3.65, and 3-3.11.3.70 thru 3-3.11.3.72 of ATP 1026000.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III, before proceeding with this JDC.

PROCEDURE:

NOTE: OSCILLOGRAPH AMPLIFIER sensitivities stated herein are nominal and may be adjusted at the discretion of the operator.

1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Insure that the CH3 AC, CH4 AC, CH5 AC, CH6 AC, 0 PH REF, and OPT

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 AUG 65

FORM 00143
Chg. 7-23-65

JOB OPTICS SLEW RATE TEST

JDC 10041 **REV** A **PAGE** 2 **OF** 6

SUBSYSTEM G AND N SYSTEM

ASSY

800 ~ PH GEN pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

3. Set the CHANNEL 2 and 6 switches on the OSCILLOGRAPH SIGNAL SELECTOR panel to 12, CHANNEL 3 and 5 switches to 11, and monitor the following signals:
   a. SXT Trunnion MDA Input at 56P9 pins 73 (high) and 56 (low) on CHANNEL 6.
   b. SXT Trunnion Tach Feedback at 56P9 pins 21 (high) and 56 (low) on CHANNEL 2.
   c. CDU Trunnion Tach Feedback at 56P9 pins 22 (high) and 56 (low) on CHANNEL 3.
   d. SCT Trunnion Tach Feedback at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

4. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS.

5. Press CHART SPEEDS 5 pushbutton on the OSCILLOGRAPH CONTROL panel and set CHANNEL 2, 3, 5 and 6 sensitivities on OSCILLOGRAPH AMPLIFIER panel to 500 mv/mm.

6. Set SCOPE "A" INPUT to SIG 2 and CROSSBAR CONTROL to 14 on PRIMARY SIGNAL SELECTOR panel to monitor the SXT Trunnion MDA Output at 45A8J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

7. Set the CONTROLLER MODE switch to DIRECT, CONTROLLER SPEED to HI, and after the ZERO ENCODER condition lamp goes out OPTICS MODE switch to MANUAL on the G & N indicator control panel.

8. Start OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

9. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the upper limit not longer than 10 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indications of CHANNELS 2, 3, 5 and 6.

10. Set VOLTMETER INPUT to DVM SIG 2 and CROSSBAR CONTROL to 99. Set DVM FUNCTION switch to AC and use dc probes to monitor SXT Trunnion MDA Input at 45A8J1 pins 2 (high) and 1 (low).

11. Measure and record the total rms voltage indicated on the DVM while holding the control stick to the lower limit not longer than 10 seconds. Release control stick, and set OPTICS MODE switch to ZERO OPTICS.

12. Set CHANNEL 1, 2 and 3 switches to 13 and CHANNEL 6 switch to 10 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals:
   a. SCT Shaft Tach Feedback at 56P9 pins 58 (high) and 56 (low) on CHANNEL 1.
   b. SXT Shaft MDA input at 56P9 pins 74 (high) and 56 (low) on CHANNEL 2.

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JOB OPTICS SLEW RATE TEST

JDC 10041 **REV** A **PAGE** 3 **OF** 6

SUBSYSTEM G AND N SYSTEM

ASSY

   c. CDU Shaft Tach Feedback at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.
   d. SXT Shaft Tach Feedback at 56P9 pins 57 (high) and 56 (low) on CHANNEL 6.

13. Set CHANNEL 1, 2, 3 and 6 sensitivities on OSCILLOGRAPH AMPLIFIER panel to 500 mv/mm.

14. Set SCOPE "A" INPUT to SIG 1 and CROSSBAR CONTROL to 14 on PRIMARY SIGNAL SELECTOR panel to monitor the SXT Shaft MDA Output at 45A8J1, pins 27 (high) and 28 (low) on the OSCILLOSCOPE.

15. After the ZERO ENCODER condition lamp goes out set the OPTICS MODE switch to MANUAL on the G & N indicator control panel. Start the OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

16. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the right limit not longer than 10 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record the maximum steady state indications of CHANNELS 1, 2, 3 and 6.

17. Set VOLTMETER INPUT to DVM SIG 2 and CROSSBAR CONTROL to 99. Set DVM FUNCTION switch to AG and use dc probes to monitor SXT Shaft MDA input at 45A8J1 pins 9 (high) and 23 (low).

18. Measure and record the total rms voltage indicated on the DVM while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch to ZERO OPTICS.

19. Set CHANNEL 1 and 3 switches to 11 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals.
   a. CDU Trunnion 16X rsvr error at 56P9 pins 19 (high) and 56 (low) on CHANNEL 1.
   b. CDU Trunnion Tach Feedback at 56P9 pins 22 (high) and 56 (low) on CHANNEL 3.

20. Set CHANNEL 1 sensitivity to 2 MV/MM and CHANNEL 3 sensitivity to 50 MV/MM.

21. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 09. Set PAVM FUNCTION selector to 0° to monitor in phase voltage of the SCT Trunnion 1X rsvr error at 45A9J1 pins 9 (high) and 23 (low).

22. Set the CONTROLLER SPEED to MED and after the ZERO ENCODER condition lamp goes out set the OPTICS MODE switch to MANUAL on the G & N indicator control panel.

23. Start OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

DATE 12 AUG 65

JOB OPTICS SLEW RATE TEST

JDC 10041 **REV** A **PAGE** 4 **OF** 6

SUBSYSTEM G AND N SYSTEM

ASSY

24. Measure and record the voltage indicated on the PAVM while holding the control stick to the upper limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indications of CHANNELS 1 and 3.

25. Set CHANNEL 4 switch to 12 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the SCT Trunnion 1X rsvr error at 56P9 pins 37 (high) and 56 (low).

26. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SXT Trunnion Tach Feedback at 4585J1 pins 10 (high) and 11 (low).

27. Set CHANNEL 4 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

28. Measure and record the voltage indicated on the PAVM while holding the control stick to the lower limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNEL 4.

29. Set OPTICS MODE switch to ZERO OPTICS.

30. Set CHANNEL 3 switch to 13 and CHANNEL 5 switch to 10 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following voltages:
   a. CDU Shaft Tach Feedback at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.
   b. CDU Shaft 16X rsvr error at 56P9 pins 20 (high) and 56 (low) on CHANNEL 5.

31. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Shaft 1X rsvr error at 45A8J1 pins 3 (high) and 12 (low).

32. Set CHANNEL 3 sensitivity to 50 MV/MM and CHANNEL 5 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel.

33. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch on G & N indicator control panel to MANUAL and CHART DRIVE switch to MM/SEC.

34. Measure and record the voltage indicated on the PAVM while holding the control stick to the right limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNELS 3 and 5.

35. Set CHANNEL 4 switch to 13 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the SCT Shaft 1X rsvr error at 56P9 pins 38 (high) and 56 (low).

36. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SXT Shaft Tach Feedback at 45A8J1 pins 17 (high) and 24 (low).

DATE 12 AUG 65

37. Set CHANNEL 4 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

38. Measure and record the voltage indicated on the PAVM while holding the control stick to the left limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNEL 4.

39. Set OPTICS MODE switch to ZERO OPTICS and CONTROLLER SPEED to LO on G & N indicator control panel.

40. Set CHANNEL 1 switch to 11 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the CDU Trunnion 16X rsvr error at 56P9 pins 19 (high) and 56 (low).

41. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL TO 08, to monitor the CDU Trunnion Tach Feedback at 45A9J1 pins 10 (high) and 11 (low).

42. Set CHANNEL 1 sensitivity to 3 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

43. Set OPTICS MODE switch on the G & N Indicator Control panel to MANUAL after ZERO ENCODER condition lamp goes out.

44. Measure and record the voltage indicated on the PAVM while holding the control stick to the upper limit until 2X trunnion CDU dial stops moving. (SXT against stop.) Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNEL 1.

45. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Trunnion Tach Feedback at 45A9J1 pins 3 (high) and 12 (low).

46. Measure and record the voltage indicated on the PAVM while holding the control stick to the lower limit until 2X trunnion CDU dial stops moving. (SXT against stop.) Release control stick and set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS.

47. Set CHANNEL 5 switch to 10 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor CDU Shaft 16X rsvr error at 56P9 pins 20 (high) and 56 (low).

48. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor CDU Shaft Tach feedback at 45A9J1 pins (2) high) and 1 (low).

49. Set CHANNEL 5 sensitivity to 1 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

50. After ZERO ENCODER condition lamp goes out, set OPTICS MODE switch on the G & N Indicator Control panel to MANUAL.

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51. Measure and record the voltage indicated on the PAVM while holding the control stick to the right limit until shaft CDU dial stops moving. (SXT against stop.) Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER to OFF and record maximum steady state indication of CHANNEL 5.

52. Set all CHANNEL switches to OFF on OSCILLOGRAPH SIGNAL SELECTOR panel.

53. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 07 to monitor SCT Shaft Tach Feedback at 45A8J1 pins 18 (high) and 19 (low).

54. Measure and record the voltage indicated on the PAVM while holding the control stick to the left limit until shaft CDU dial stops moving. (SXT against stop.) Release control stick and set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC
NO. 10041
REV. A
INITIAL TDRR 21539

JOB OPTICS SLEW RATE TEST

ASSEMBLY UNDER TEST

TITLE ____________________
SER. NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________________ SER. NO. ________ CAL DATE
NAME ____________________ SER. NO. ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
9	SXT TRN TACH FEEDBACK SMC	V rms	3.7				4.9		
	CDU TRN TACH FEEDBACK SMC	V rms	3.7				4.9		
	SCT TRN TACH FEEDBACK SMC	V rms	3.7				4.9		
	SXT TRN MDA INPUT SMC	V rms	9.0				12.0		
	SXT TRN MDA OUTPUT PSA	V p-p	15				25		
11	SXT TRN MDA INPUT PSA	V rms	9.0				12.0		
16	SXT SHAFT MDA OUTPUT PSA	V p-p	15				25		
	SCT SHAFT TACH FEEDBACK SMC	V rms	7.4				9.0		
	SXT SHAFT MDA INPUT SMC	V rms	9.0				12.0		

* TO BE USED AS REQUIRED OR DESIRED

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 10041
REV. A

JOB OPTICS SLEW RATE TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
16 (cont)	CDU SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
	SXT SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
18	SXT SHAFT MDA INPUT PSA	V rms	9.0				12.0		
24	SCT TRN 1X RSVR ERROR PSA	V rms	0.0				0.01		
	CDU TRN 16X RSVR ERROR SMC	V rms	0.0				0.01		
	CDU TRN TACH FEEDBACK SMC	V rms	0.85				1.25		
28	SXT TRN TACH FEEDBACK PSA	V rms	0.85				1.25		
	SCT TRN 1X RSVR ERROR SMC	V rms	0.0				0.01		
34	SCT SHAFT 1X RSVR ERROR PSA	V rms	0.0				0.02		
	CDU SHAFT TACH FEEDBACK SMC	V rms	0.85				1.25		
	CDU SHAFT 16X RSVR ERROR SMC	V rms	0.0				0.01		

* TO BE USED AS REQUIRED OR DESIRED

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 10041
REV A

JOB OPTICS SLEW RATE TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
38	SXT SHAFT TACH FEEDBACK PSA	V rms	0.85				1.29		
	SCT SHAFT 1X RSVR ERROR SMC	V rms	0.0				0.02		
44	CDU TRN TACH FEEDBACK PSA	V rms	0.085				0.125		
	CDU TRN 16X RSVR ERROR SMC	V rms	0.0				0.01		
46	SCT TRN TACH FEEDBACK PSA	V rms	0.042				0.065		
51	CDU SHAFT TACH FEEDBACK PSA	V rms	0.085				0.125		
	CDU SHAFT 16X RSVR ERROR SMC	V rms	0.0				0.01		
54	SCT SHAFT TACH FEEDBACK PSA	V rms	0.085				0.125		

*** TO BE USED AS REQUIRED OR DESIRED**

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JDC 10041 REV. B PAGE 1 OF 6
INITIAL TDRR 21539 D.S. PGS 3

JOB OPTICS SLEW RATE TEST

SUBSYSTEM G AND N SYSTEM

ASSY.

DESCRIPTION The test demonstrates slewing performance of the optics servo loops.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	10-1-65	22857	All	All	WK	ACM
B	11-3-65	23737	All	All	WK	ACM

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.8.3, 3-3.11.2.104 thru 3-3.11.2.106, 3-3.11.2.108, 3-3.11.2.109, 3-3.11.2.118 thru 3-3.11.2.120, 3-3.11.3.53, 3-3.11.3.54, 3-3.11.3.58, 3-3.11.3.64, 3-3.11.3.65, and 3-3.11.3.70 thru 3-3.11.3.72 of ATP 1026000.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III, before proceeding with this JDC.

PROCEDURE:

NOTE: OSCILLOGRAPH AMPLIFIER sensitivities stated herein are nominal and may be adjusted at the discretion of the operator.

1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Insure that the CH3 AC, CH4 AC, CH5 AC, CH6 AC, 0 PH REF, and OPT 800 ~ PH GEN pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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JOB OPTICS SLEW RATE TEST | JDC 10041 REV B PAGE 2 OF 6

SUBSYSTEM G AND N SYSTEM | ASSY

(800 ~ PH GEN pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.)

3. Set the CHANNEL 2 and 6 switches on the OSCILLOGRAPH SIGNAL SELECTOR panel to 12, CHANNEL 3 and 5 switches to 11, and monitor the following signals:
   a. SXT Trunnion MDA Input at 56P9 pins 73 (high) and 56 (low) on CHANNEL 6.
   b. SXT Trunnion Tach Feedback at 56P9 pins 21 (high) and 56 (low) on CHANNEL 2.
   c. CDU Trunnion Tach Feedback at 56P9 pins 22 (high) and 56 (low) on CHANNEL 3.
   d. SCT Trunnion Tach Feedback at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

4. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS.

5. Press CHART SPEEDS 5 pushbutton on the OSCILLOGRAPH CONTROL panel and set CHANNEL 2, 3, 5 and 6 sensitivities on OSCILLOGRAPH AMPLIFIER panel to 500 mv/mm.

6. Set SCOPE "A" INPUT to SIG 2 and CROSSBAR CONTROL to 14 on PRIMARY SIGNAL SELECTOR panel to monitor the SXT Trunnion MDA Output at 45A8J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

7. Set the CONTROLLER MODE switch to DIRECT, CONTROLLER SPEED to HI, and after the ZERO ENCODER condition lamp goes out OPTICS MODE switch to MANUAL on the G & N indicator control panel.

8. Start OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

9. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the upper limit not longer than 10 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indications of CHANNELS 2, 3, 5 and 6.

10. Set VOLTMETER INPUT to DVM SIG 2 and CROSSBAR CONTROL to 99. Set DVM FUNCTION switch to AC and use dc probes to monitor SXT Trunnion MDA Input at 45A8J1 pins 2 (high) and 1 (low).

11. Measure and record the total rms voltage indicated on the DVM while holding the control stick to the lower limit not longer than 10 seconds. Release control stick, and set OPTICS MODE switch to ZERO OPTICS.

12. Set CHANNEL 1, 2 and 3 switches to 13 and CHANNEL 6 switch to 10 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals:
   a. SCT Shaft Tach Feedback at 56P9 pins 58 (high) and 56 (low) on CHANNEL 1.
   b. SXT Shaft MDA input at 56P9 pins 74 (high) and 56 (low) on CHANNEL 2.

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JOB OPTICS SLEW RATE TEST | JDC 10041 REV B PAGE 3 OF 6

SUBSYSTEM G AND N SYSTEM | ASSY

   c. CDU Shaft Tach Feedback at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.
   d. SXT Shaft Tach Feedback at 56P9 pins 57 (high) and 56 (low) on CHANNEL 6.

13. Set CHANNEL 1, 2, 3 and 6 sensitivities on OSCILLOGRAPH AMPLIFIER panel to 500 mv/mm.

14. Set SCOPE "A" INPUT to SIG 1 and CROSSBAR CONTROL to 14 on PRIMARY SIGNAL SELECTOR panel to monitor the SXT Shaft MDA Output at 45A8J1, pins 27 (high) and 28 (low) on the OSCILLOSCOPE.

15. After the ZERO ENCODER condition lamp goes out set the OPTICS MODE switch to MANUAL on the G & N indicator control panel. Start the OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

16. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the right limit not longer than 10 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record the maximum steady state indications of CHANNELS 1, 2, 3 and 6.

17. Set VOLTMETER INPUT to DVM SIG 2 and CROSSBAR CONTROL to 99. Set DVM FUNCTION switch to AG and use dc probes to monitor SXT Shaft MDA Input at 45A8J1 pins 9 (high) and 23 (low).

18. Measure and record the total rms voltage indicated on the DVM while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch to ZERO OPTICS.

19. Set CHANNEL 1 and 3 switches to 11 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals.
   a. CDU Trunnion 16X rsvr error at 56P9 pins 19 (high) and 56 (low) on CHANNEL 1.
   b. CDU Trunnion Tach Feedback at 56P9 pins 22 (high) and 56 (low) on CHANNEL 3.

20. Set CHANNEL 1 sensitivity to 2 MV/MM and CHANNEL 3 sensitivity to 50 MV/MM.

21. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 09. Set PAVM FUNCTION selector to 0° to monitor in phase voltage of the SCT Trunnion 1X rsvr error at 45A9J1 pins 9 (high) and 23 (low).

22. Set the CONTROLLER SPEED to MED and after the ZERO ENCODER condition lamp goes out set the OPTICS MODE switch to MANUAL on the G & N indicator control panel.

23. Start OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

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JOB OPTICS SLEW RATE TEST | JDC 10041 REV B PAGE 4 OF 6

SUBSYSTEM G AND N SYSTEM | ASSY

24. Measure and record the voltage indicated on the PAVM while holding the control stick to the upper limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indications of CHANNELS 1 and 3.

25. Set CHANNEL 4 switch to 12 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the SCT Trunnion 1X rsvr error at 56P9 pins 37 (high) and 56 (low).

26. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SXT Trunnion Tach Feedback at 4585J1 pins 10 (high) and 11 (low).

27. Set CHANNEL 4 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

28. Measure and record the voltage indicated on the PAVM while holding the control stick to the lower limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNEL 4.

29. Set OPTICS MODE switch to ZERO OPTICS.

30. Set CHANNEL 3 switch to 13 and CHANNEL 5 switch to 10 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following voltages:
   a. CDU Shaft Tach Feedback at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.
   b. CDU Shaft 16X rsvr error at 56P9 pins 20 (high) and 56 (low) on CHANNEL 5.

31. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Shaft 1X rsvr error at 45A8J1 pins 3 (high) and 12 (low).

32. Set CHANNEL 3 sensitivity to 50 MV/MM and CHANNEL 5 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel.

33. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch on G & N indicator control panel to MANUAL and CHART DRIVE switch to MM/SEC.

34. Measure and record the voltage indicated on the PAVM while holding the control stick to the right limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNELS 3 and 5.

35. Set CHANNEL 4 switch to 13 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the SCT Shaft 1X rsvr error at 56P9 pins 38 (high) and 56 (low).

36. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SXT Shaft Tach Feedback at 45A8J1 pins 17 (high) and 24 (low).

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JDC
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REV. B

JOB OPTICS SLEW RATE TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
38	SXT SHAFT TACH FEEDBACK PSA	V rms	0.85				1.29		
	SCT SHAFT 1X RSVR ERROR SMC	V rms	0.0				0.02		
44	CDU TRN TACH FEEDBACK PSA	V rms	0.085				0.125		
	CDU TRN 16X RSVR ERROR SMC	V rms	0.0				0.01		
46	SCT TRN TACH FEEDBACK PSA	V rms	0.042				0.065		
51	CDU SHAFT TACH FEEDBACK PSA	V rms	0.085				0.125		
	CDU SHAFT 16X RSVR ERROR SMC	V rms	0.0				0.01		
54	SCT SHAFT TACH FEEDBACK PSA	V rms	0.085				0.125		

* TO BE USED AS REQUIRED OR DESIRED

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JOB OPTICS SLEW RATE TEST | JDC 10041 REV. C PAGE 1 OF 6 | INITIAL TDRR 21539 D.S. PGS 3

SUBSYSTEM G AND N SYSTEM | ASSY.

DESCRIPTION The test demonstrates slewing performance of the optics servo loops.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA
A	10-1-65	22857	All	All	WK	ACM
B	11-3-65	23737	All	All	WK	ACM
C	12-7-65	24614	All	All	WK	

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.8.3, 3-3.11.2.104 thru 3-3.11.2.106, 3-3.11.2.108, 3-3.11.2.109, 3-3.11.2.118 thru 3-3.11.2.120, 3-3.11.3.53, 3-3.11.3.54, 3-3.11.3.58, 3-3.11.3.64, 3-3.11.3.65, and 3-3.11.3.70 thru 3-3.11.3.72 of ATP 1026000.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III, before proceeding with this JDC.

PROCEDURE:

NOTE: OSCILLOGRAPH AMPLIFIER sensitivities stated herein are nominal and may be adjusted at the discretion of the operator.

1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Insure that the CH3 AC, CH4 AC, CH5 AC, CH6 AC, 0 PH REF, and OPT

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JOB OPTICS SLEW RATE TEST | JDC 10041 REV C PAGE 2 OF 6

SUBSYSTEM G AND N SYSTEM | ASSY

800~ PH GEN pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

3. Set the CHANNEL 2 and 6 switches on the OSCILLOGRAPH SIGNAL SELECTOR panel to 12, CHANNEL 3 and 5 switches to 11, and monitor the following signals:
   a. SXT Trunnion MDA Input at 56P9 pins 73 (high) and 56 (low) on CHANNEL 6.
   b. SXT Trunnion Tach Feedback at 56P9 pins 21 (high) and 56 (low) on CHANNEL 2.
   c. CDU Trunnion Tach Feedback at 56P9 pins 22 (high) and 56 (low) on CHANNEL 3.
   d. SCT Trunnion Tach Feedback at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

4. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS.

5. Press CHART SPEEDS 5 pushbutton on the OSCILLOGRAPH CONTROL panel and set CHANNEL 2, 3, 5 and 6 sensitivities on OSCILLOGRAPH AMPLIFIER panel to 500 mv/mm.

6. Set SCOPE "A" INPUT to SIG 2 and CROSSBAR CONTROL to 14 on PRIMARY SIGNAL SELECTOR panel to monitor the SXT Trunnion MDA Output at 45A8J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

7. Set the CONTROLLER MODE switch to DIRECT, CONTROLLER SPEED to HI, and after the ZERO ENCODER condition lamp goes out OPTICS MODE switch to MANUAL on the G & N indicator control panel.

8. Start OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

9. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the upper limit not longer than 10 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indications of CHANNELS 2, 3, 5 and 6.

10. Set VOLTMETER INPUT to DVM SIG 2 and CROSSBAR CONTROL to 99. Set DVM FUNCTION switch to AC and use dc probes to monitor SXT Trunnion MDA Input at 45A8J1 pins 2 (high) and 1 (low).

11. Measure and record the total rms voltage indicated on the DVM while holding the control stick to the lower limit not longer than 10 seconds. Release control stick, and set OPTICS MODE switch to ZERO OPTICS.

12. Set CHANNEL 1, 2 and 3 switches to 13 and CHANNEL 6 switch to 10 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals:
   a. SCT Shaft Tach Feedback at 56P9 pins 58 (high) and 56 (low) on CHANNEL 1.
   b. SXT Shaft MDA input at 56P9 pins 74 (high) and 56 (low) on CHANNEL 2.

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SUBSYSTEM G AND N SYSTEM | ASSY

   c. CDU Shaft Tach Feedback at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.
   d. SXT Shaft Tach Feedback at 56P9 pins 57 (high) and 56 (low) on CHANNEL 6.

13. Set CHANNEL 1, 2, 3 and 6 sensitivities on OSCILLOGRAPH AMPLIFIER panel to 500 mv/mm.

14. Set SCOPE "A" INPUT to SIG 1 and CROSSBAR CONTROL to 14 on PRIMARY SIGNAL SELECTOR panel to monitor the SXT Shaft MDA Output at 45A8J1, pins 27 (high) and 28 (low) on the OSCILLOSCOPE.

15. After the ZERO ENCODER condition lamp goes out set the OPTICS MODE switch to MANUAL on the G & N indicator control panel. Start the OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

16. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the right limit not longer than 10 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record the maximum steady state indications of CHANNELS 1, 2, 3 and 6.

17. Set VOLTMETER INPUT to DVM SIG 2 and CROSSBAR CONTROL to 99. Set DVM FUNCTION switch to AG and use dc probes to monitor SXT Shaft MDA input at 45A8J1 pins 9 (high) and 23 (low).

18. Measure and record the total rms voltage indicated on the DVM while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch to ZERO OPTICS.

19. Set CHANNEL 1 and 3 switches to 11 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals.
   a. CDU Trunnion 16X rsvr error at 56P9 pins 19 (high) and 56 (low) on CHANNEL 1.
   b. CDU Trunnion Tach Feedback at 56P9 pins 22 (high) and 56 (low) on CHANNEL 3.

20. Set CHANNEL 1 sensitivity to 2 MV/MM and CHANNEL 3 sensitivity to 50 MV/MM.

21. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 09. Set PAVM FUNCTION selector to 0° to monitor in phase voltage of the SCT Trunnion 1X rsvr error at 45A9J1 pins 9 (high) and 23 (low).

22. Set the CONTROLLER SPEED to MED and after the ZERO ENCODER condition lamp goes out set the OPTICS MODE switch to MANUAL on the G & N indicator control panel.

23. Start OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

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JOB OPTICS SLEW RATE TEST | JDC 10041 REV C PAGE 4 OF 6

SUBSYSTEM G AND N SYSTEM | ASSY

24. Measure and record the voltage indicated on the PAVM while holding the control stick to the upper limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indications of CHANNELS 1 and 3.

25. Set CHANNEL 4 switch to 12 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the SCT Trunnion 1X rsvr error at 56P9 pins 37 (high) and 56 (low).

26. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SXT Trunnion Tach Feedback at 4585J1 pins 10 (high) and 11 (low).

27. Set CHANNEL 4 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

28. Measure and record the voltage indicated on the PAVM while holding the control stick to the lower limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNEL 4.

29. Set OPTICS MODE switch to ZERO OPTICS.

30. Set CHANNEL 3 switch to 13 and CHANNEL 5 switch to 10 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following voltages:
   a. CDU Shaft Tach Feedback at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.
   b. CDU Shaft 16X rsvr error at 56P9 pins 20 (high) and 56 (low) on CHANNEL 5.

31. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Shaft 1X rsvr error at 45A8J1 pins 3 (high) and 12 (low).

32. Set CHANNEL 3 sensitivity to 50 MV/MM and CHANNEL 5 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel.

33. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch on G & N indicator control panel to MANUAL and CHART DRIVE switch to MM/SEC.

34. Measure and record the voltage indicated on the PAVM while holding the control stick to the right limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNELS 3 and 5.

35. Set CHANNEL 4 switch to 13 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the SCT Shaft 1X rsvr error at 56P9 pins 38 (high) and 56 (low).

36. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SXT Shaft Tach Feedback at 45A8J1 pins 17 (high) and 24 (low).

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SUBSYSTEM G AND N SYSTEM | ASSY

37. Set CHANNEL 4 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

38. Measure and record the voltage indicated on the PAVM while holding the control stick to the left limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNEL 4.

39. Set OPTICS MODE switch to ZERO OPTICS and CONTROLLER SPEED to LO on G & N indicator control panel.

40. Set CHANNEL 1 switch to 11 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the CDU Trunnion 16X rsvr error at 56P9 pins 19 (high) and 56 (low).

41. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL TO 08, to monitor the CDU Trunnion Tach Feedback at 45A9J1 pins 10 (high) and 11 (low).

42. Set CHANNEL 1 sensitivity to 3 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

43. Set OPTICS MODE switch on the G & N Indicator Control panel to MANUAL after ZERO ENCODER condition lamp goes out.

44. Measure and record the voltage indicated on the PAVM while holding the control stick to the upper limit until 2X trunnion CDU dial stops moving. (SXT against stop.) Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNEL 1.

45. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Trunnion Tach Feedback at 45A9J1 pins 3 (high) and 12 (low).

46. Measure and record the voltage indicated on the PAVM while holding the control stick to the lower limit until 2X trunnion CDU dial stops moving. (SXT against stop.) Release control stick and set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS.

47. Set CHANNEL 5 switch to 10 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor CDU Shaft 16X rsvr error at 56P9 pins 20 (high) and 56 (low).

48. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor CDU Shaft Tach feedback at 45A9J1 pins (2) high) and 1 (low).

49. Set CHANNEL 5 sensitivity to 1 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

50. After ZERO ENCODER condition lamp goes out, set OPTICS MODE switch on the G & N Indicator Control panel to MANUAL.

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SUBSYSTEM G AND N SYSTEM | ASSY

51. Measure and record the voltage indicated on the PAVM while holding the control stick to the right limit until shaft CDU dial stops moving. (SXT against stop.) Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER to OFF and record maximum steady state indication of CHANNEL 5.

52. Set all CHANNEL switches to OFF on OSCILLOGRAPH SIGNAL SELECTOR panel.

53. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 07 to monitor SCT Shaft Tach Feedback at 45A8J1 pins 18 (high) and 19 (low).

54. Measure and record the voltage indicated on the PAVM while holding the control stick to the left limit until shaft CDU dial stops moving. (SXT against stop.) Release control stick and set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS.

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EQUIPMENT TEST
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JDC
NO. 10041
REV. C
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JOB OPTICS SLEW RATE TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE START ______ END ______ SITE / LOCATION ______

TIME START ______ END ______ TOTAL ELAPSED ______

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE ______

NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
9	SXT TRN TACH FEEDBACK SMC	V rms	7.4				9.9		
	CDU TRN TACH FEEDBACK SMC	V rms	7.4				9.9		
	SCT TRN TACH FEEDBACK SMC	V rms	3.7				4.9		
	SXT TRN MDA INPUT SMC	V rms	9.0				12.0		
	SXT TRN MDA OUTPUT PSA	V p-p	10				25		
11	SXT TRN MDA INPUT PSA	V rms	9.0				12.0		
16	SXT SHAFT MDA OUTPUT PSA	V p-p	15				25		
	SCT SHAFT TACH FEEDBACK SMC	V rms	7.4				9.0		
	SXT SHAFT MDA INPUT SMC	V rms	9.0				12.0		

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 10041
REV. C

JOB OPTICS SLEW RATE TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
16 (cont)	CDU SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
	SXT SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
18	SXT SHAFT MDA INPUT PSA	V rms	9.0				12.0		
24	SCT TRN 1X RSVR ERROR PSA	V rms	0.0				0.01		
	CDU TRN 16X RSVR ERROR SMC	V rms	0.0				0.01		
	CDU TRN TACH FEEDBACK SMC	V rms	0.85				1.25		
28	SXT TRN TACH FEEDBACK PSA	V rms	0.85				1.25		
	SCT TRN 1X RSVR ERROR SMC	V rms	0.0				0.01		
34	SCT SHAFT 1X RSVR ERROR PSA	V rms	0.0				0.02		
	CDU SHAFT TACH FEEDBACK SMC	V rms	0.85				1.25		
	CDU SHAFT 16X RSVR ERROR SMC	V rms	0.0				0.01		

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 3

JDC
NO. 10041
REV. C

JOB OPTICS SLEW RATE TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
38	SXT SHAFT TACH FEEDBACK PSA	V rms	0.85				1.29		
	SCT SHAFT 1X RSVR ERROR SMC	V rms	0.0				0.02		
44	CDU TRN TACH FEEDBACK PSA	V rms	0.085				0.125		
	CDU TRN 16X RSVR ERROR SMC	V rms	0.0				0.01		
46	SCT TRN TACH FEEDBACK PSA	V rms	0.042				0.065		
51	CDU SHAFT TACH FEEDBACK PSA	V rms	0.085				0.125		
	CDU SHAFT 16X RSVR ERROR SMC	V rms	0.0				0.01		
54	SCT SHAFT TACH FEEDBACK PSA	V rms	0.085				0.125		

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

JOB OPTICS SLEW RATE TEST
JDC 10041 **REV.** D **PAGE** 1 **OF** 6
INITIAL TDRR 21539 **D.S. PGS** 3
SUBSYSTEM G AND N SYSTEM
ASSY.
DESCRIPTION The test demonstrates slewing performance of the optics servo loops.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA
A	10-1-65	22857	All	All	WK	ACM
B	11-3-65	23737	All	All	WK	ACM
C	12-7-65	24614	All	All	WK	-
D	1 18 66	25345	3,4,5,6	1,2,3	WK	WM/

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.8.3, 3-3.11.2.104 thru 3-3.11.2.106, 3-3.11.2.108, 3-3.11.2.109, 3-3.11.2.118 thru 3-3.11.2.120, 3-3.11.3.53, 3-3.11.3.54, 3-3.11.3.58, 3-3.11.3.64, 3-3.11.3.65, and 3-3.11.3.70 thru 3-3.11.3.72 of ATP 1026000.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III, before proceeding with this JDC.

PROCEDURE:

NOTE: OSCILLOGRAPH AMPLIFIER sensitivities stated herein are nominal and may be adjusted at the discretion of the operator.

1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Insure that the CH3 AC, CH4 AC, CH5 AC, CH6 AC, 0 PH REF, and OPT 800~ PH GEN pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

FORM [illegible]
Chg. 7-2[illegible]

3. Set the CHANNEL 2 and 6 switches on the OSCILLOGRAPH SIGNAL SELECTOR panel to 12, CHANNEL 3 and 5 switches to 11, and monitor the following signals:
   a. SXT Trunnion MDA Input at 56P9 pins 73 (high) and 56 (low) on CHANNEL 6.
   b. SXT Trunnion Tach Feedback at 56P9 pins 21 (high) and 56 (low) on CHANNEL 2.
   c. CDU Trunnion Tach Feedback at 56P9 pins 22 (high) and 56 (low) on CHANNEL 3.
   d. SCT Trunnion Tach Feedback at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

4. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS.

5. Press CHART SPEEDS 5 pushbutton on the OSCILLOGRAPH CONTROL panel and set CHANNEL 2, 3, 5 and 6 sensitivities on OSCILLOGRAPH AMPLIFIER panel to 500 mv/mm.

6. Set SCOPE "A" INPUT to SIG 2 and CROSSBAR CONTROL to 14 on PRIMARY SIGNAL SELECTOR panel to monitor the SXT Trunnion MDA Output at 45A8J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

7. Set the CONTROLLER MODE switch to DIRECT, CONTROLLER SPEED to HI, and after the ZERO ENCODER condition lamp goes out OPTICS MODE switch to MANUAL on the G & N indicator control panel.

8. Start OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

9. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the upper limit not longer than 10 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indications of CHANNELS 2, 3, 5 and 6.

10. Set VOLTMETER INPUT to DVM SIG 2 and CROSSBAR CONTROL to 99. Set DVM FUNCTION switch to AC and use dc probes to monitor SXT Trunnion MDA Input at 45A8J1 pins 2 (high) and 1 (low).

11. Measure and record the total rms voltage indicated on the DVM while holding the control stick to the lower limit not longer than 10 seconds. Release control stick, and set OPTICS MODE switch to ZERO OPTICS.

12. Set CHANNEL 1, 2 and 3 switches to 13 and CHANNEL 6 switch to 10 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals:
   a. SCT Shaft Tach Feedback at 56P9 pins 58 (high) and 56 (low) on CHANNEL 1.
   b. SXT Shaft MDA input at 56P9 pins 74 (high) and 56 (low) on CHANNEL 2.
   c. CDU Shaft Tach Feedback at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.
   d. SXT Shaft Tach Feedback at 56P9 pins 57 (high) and 56 (low) on CHANNEL 6.

13. Set CHANNEL 1, 2, 3 and 6 sensitivities on OSCILLOGRAPH AMPLIFIER panel to 500 mv/mm.

14. Set SCOPE "A" INPUT to SIG 1 and CROSSBAR CONTROL to 14 on PRIMARY SIGNAL SELECTOR panel to monitor the SXT Shaft MDA Output at 45A8J1, pins 27 (high) and 28 (low) on the OSCILLOSCOPE.

15. After the ZERO ENCODER condition lamp goes out set the OPTICS MODE switch to MANUAL on the G & N indicator control panel. Start the OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

16. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the right limit not longer than 10 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record the maximum steady state indications of CHANNELS 1, 2, 3 and 6.

17. Set VOLTMETER INPUT to DVM SIG 2 and CROSSBAR CONTROL to 99. Set DVM FUNCTION switch to AG and use dc probes to monitor SXT Shaft MDA input at 45A8J1 pins 9 (high) and 23 (low).

18. Measure and record the total rms voltage indicated on the DVM while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch to ZERO OPTICS.

19. Set CHANNEL 1 and 3 switches to 11 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals.
   a. CDU Trunnion 16X rsvr error at 56P9 pins 19 (high) and 56 (low) on CHANNEL 1.
   b. CDU Trunnion Tach Feedback at 56P9 pins 22 (high) and 56 (low) on CHANNEL 3.

20. Set CHANNEL 1 sensitivity to 2 MV/MM and CHANNEL 3 sensitivity to 50 MV/MM and press CHART SPEEDS 20 pushbutton on the OSCILLOGRAPH CONTROL panel.

21. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 09. Set PAVM FUNCTION selector to 0° to monitor in phase voltage of the SCT Trunnion 1X rsvr error at 45A9J1 pins 9 (high) and 23 (low).

22. Set the CONTROLLER SPEED to MED and after the ZERO ENCODER condition lamp goes out set the OPTICS MODE switch to MANUAL on the G & N indicator control panel.

23. Start OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

24. Measure and record the voltage indicated on the PAVM while holding the control stick to the upper limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record steady state indication per Figure 1 of CHANNELS 1 and 3. Record maximum width of any pulses at 1/2 positive peak or 1/2 negative peak points on CHANNELS 1 and 3 per Figure 1.

25. Set CHANNEL 4 switch to 12 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the SCT Trunnion 1X rsvr error at 56P9 pins 37 (high) and 56 (low).

26. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SXT Trunnion Tach Feedback at 4585J1 pins 10 (high) and 11 (low).

27. Set CHANNEL 4 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

28. Measure and record the voltage indicated on the PAVM while holding the control stick to the lower limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record steady state indication per Figure 1 of CHANNEL 4. Record maximum width of any pulses at 1/2 positive peak or 1/2 negative peak points on CHANNEL 4 per Figure 1.

29. Set OPTICS MODE switch to ZERO OPTICS.

30. Set CHANNEL 3 switch to 13 and CHANNEL 5 switch to 10 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following voltages:
   a. CDU Shaft Tach Feedback at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.
   b. CDU Shaft 16X rsvr error at 56P9 pins 20 (high) and 56 (low) on CHANNEL 5.

31. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Shaft 1X rsvr error at 45A8J1 pins 3 (high) and 12 (low).

32. Set CHANNEL 3 sensitivity to 50 MV/MM and CHANNEL 5 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel.

33. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch on G & N indicator control panel to MANUAL and CHART DRIVE switch to MM/SEC.

34. Measure and record the voltage indicated on the PAVM while holding the control stick to the right limit not longer than 20 seconds. Release control stick and set

seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record steady state indication per Figure 1 of CHANNELS 3 and 5. Record maximum width of any pulses at 1/2 positive peak or 1/2 negative peak points on CHANNEL 3 and 5 per Figure 1.

35. Set CHANNEL 4 switch to 13 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the SCT Shaft 1X rsvr error at 56P9 pins 38 (high) and 56 (low).

36. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SXT Shaft Tach Feedback at 45A8J1 pins 17 (high) and 24 (low).

37. Set CHANNEL 4 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

38. Measure and record the voltage indicated on the PAVM while holding the control stick to the left limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record steady state indication of CHANNEL 4 per Figure 1. Record maximum width of any pulses at 1/2 positive peak or 1/2 negative peak points on CHANNEL 4 per Figure 1.

39. Set OPTICS MODE switch to ZERO OPTICS and CONTROLLER SPEED to LO on G & N indicator control panel.

40. Set CHANNEL 1 switch to 11 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the CDU Trunnion 16X rsvr error at 56P9 pins 19 (high) and 56 (low).

41. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL TO 08, to monitor the CDU Trunnion Tach Feedback at 45A9J1 pins 10 (high) and 11 (low).

42. Set CHANNEL 1 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

43. Set OPTICS MODE switch on the G & N Indicator Control panel to MANUAL after ZERO ENCODER condition lamp goes out.

44. Measure and record the voltage indicated on the PAVM while holding the control stick to the upper limit until 2X trunnion CDU dial stops moving. (SXT against stop.) Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record steady state indication of CHANNEL 1 per Figure 1. Record maximum width of any pulses at 1/2 positive peak or 1/2 negative peak points on CHANNEL 1 per Figure 1.

45. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Trunnion Tach Feedback at 45A9J1 pins 3 (high) and 12 (low).

---

45. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Trunnion Tach Feedback at 45A9J1 pins 3 (high) and 12 (low).

46. Measure and record the voltage indicated on the PAVM while holding the control stick to the lower limit until 2X trunnion CDU dial stops moving. (SXT against stop.) Release control stick and set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS.

47. Set CHANNEL 5 switch to 10 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor CDU Shaft 16X rsvr error at 56P9 pins 20 (high) and 56 (low).

48. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor CDU Shaft Tach feedback at 45A9J1 pins (2) high) and 1 (low).

49. Set CHANNEL 5 sensitivity to 1 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

50. After ZERO ENCODER condition lamp goes out, set OPTICS MODE switch on the G & N Indicator Control panel to MANUAL.

51. Measure and record the voltage indicated on the PAVM while holding the control stick to the right limit until shaft CDU dial stops moving. (SXT against stop.) Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER to OFF and record steady state indication of CHANNEL 5 per Figure 1. Record maximum width of any pulses at 1/2 positive peak or 1/2 negative peak points of CHANNEL 5 per Figure 1.

52. Set all CHANNEL switch to OFF on OSCILLOGRAPH SIGNAL SELECTOR panel.

53. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 07 to monitor SCT Shaft Tach Feedback at 45A8J1 pins 18 (high) and 19 (low).

54. Measure and record the voltage indicated on the PAVM while holding the control stick to the left limit until shaft CDU dial stops moving. (SXT against stop.) Release control stick and set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS.

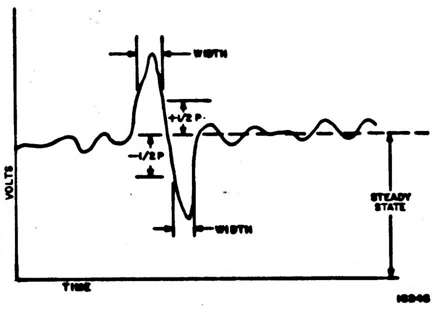

Figure 1. Signal Characteristics Diagram

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 4

JDC
NO. 10041
REV. D
INITIAL TDRR 2 539

JOB OPTICS SLEW RATE TEST

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CA. DATE
NAME ____ SER. NO. ____ CA. DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES 1st	2nd*	3rd*	MAX VALUE	REJ	ACC
9	SXT TRN TACH FEEDBACK SMC	V rms	7.4				9.9		
	CDU TRN TACH FEEDBACK SMC	V rms	7.4				9.9		
	SCT TRN TACH FEEDBACK SMC	V rms	3.7				4.9		
	SXT TRN MDA INPUT SMC	V rms	9.0				12.0		
	SXT TRN MDA OUTPUT PSA	V p-p	10				25		
11	SXT TRN MDA INPUT PSA	V rms	9.0				12.0		
16	SXT SHAFT MDA OUTPUT PSA	V p-p	15				25		
	SCT SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
	SXT SHAFT MDA INPUT SMC	V rms	9.0				12.0		

* TO BE USED AS REQUIRED OR DESIRED

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 4

JDC
NO. 10041
REV. D

JOB OPTICS SLEW RATE TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES 1st	2nd*	3rd*	MAX VALUE	REJ	ACC
16 (cont)	CDU SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
	SXT SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
18	SXT SHAFT MDA INPUT PSA	V rms	9.0				12.0		
24	SCT TRN 1X RSVR ERROR PSA	V rms	0.0				0.01		
	CDU TRN 16X RSVR ERROR SMC	V rms	0.0				0.01		
	CDU TRN 16X RSVR ERROR SMC PULSE WIDTH	m.sec.	▨				200		
	CDU TRN TACH FEEDBACK SMC	V rms	0.85				1.25		
	CDU TRN TACH FEEDBACK SMC PULSE WIDTH	m.sec.	▨				200		
28	SXT TRN TACH FEEDBACK PSA	V rms	0.85				1.25		
	SCT TRN 1X RSVR ERROR SMC	V rms	0.0				0.01		
	SCT TRN 1X RSVR ERROR SMC PULSE WIDTH	m.sec.	▨				200		

* TO BE USED AS REQUIRED OR DESIRED

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 4

JDC
NO. 10041
REV. D

JOB ______

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
34	SCT SHAFT 1X RSVR ERROR PSA	V rms	0.0				0.02		
	CDU SHAFT TACH FEEDBACK SMC	V rms	0.85				1.25		
	CDU SHAFT TACH FEEDBACK SMC PULSE WIDTH	m.sec.					200		
	CDU SHAFT 16X RSVR ERROR SMC	V rms	0.0				0.01		
	CDU SHAFT 16X RSVR ERROR SMC PULSE WIDTH	m.sec.	▨				200		
38	SXT SHAFT TACH FEEDBACK PSA	V rms	0.85				1.29		
	SCT SHAFT 1X RSVR ERROR SMC	V rms	0.0				0.02		
	SCT SHAFT 1X RSVR ERROR SMC PULSE WIDTH	m.sec.					200		
44	CDU TRN TACH FEEDBACK PSA	V rms	0.085				0.125		
	CDU TRN 16X RSVR ERROR SMC	V rms	0.0				0.01		
	CDU SHAFT 16X RSVR ERROR SMC PULSE WIDTH	m. sec.					250		
46	SCT TRN TACH FEEDBACK PSA	V rms	0.042				0.065		

*** TO BE USED AS REQUIRED OR DESIRED**

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 4

JDC
NO. 10041
REV. D

JOB ______

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
51	CDU SHAFT TACH FEEDBACK PSA	V rms	0.085				0.125		
	CDU SHAFT 16X RSVR ERROR SMC	V rms	0.0				0.01		
	CDU SHAFT 16X RSVR ERROR SMC PULSE WIDTH	m.sec.					250		
54	SCT SHAFT TACH FEEDBACK PSA	V rms	0.085				0.125		

*** TO BE USED AS REQUIRED OR DESIRED**

DATE 12 AUG 65

JOB OPTICS SLEW RATE TEST
JDC 10041 **REV.** E **PAGE** 1 **OF** 6
INITIAL TDRR 21539 **DS PGS** 4

SUBSYSTEM G AND N SYSTEM
ASSY.
DESCRIPTION The test demonstrates slewing performance of the optics servo loops.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	10-1-65	22857	All	All	WK	ACM
B	11-3-65	23737	All	All	WK	ACM
C	12-7-65	24614	All	All	WK	-
D	1 18 66	25345	3,4,5,6	1,2,3	WK	WM
E	6-7-66	29398	4	-	MM	-

REFERENCES	See below.
IMPORTANT	See below.
INTERVAL	
TOOLS AND MATERIAL	Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.8.3, 3-3.11.2.104 thru 3-3.11.2.106, 3-3.11.2.108, 3-3.11.2.109, 3-3.11.2.118 thru 3-3.11.2.120, 3-3.11.3.53, 3-3.11.3.54, 3-3.11.3.58, 3-3.11.3.64, 3-3.11.3.65, and 3-3.11.3.70 thru 3-3.11.3.72 of ATP 1026000.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III, before proceeding with this JDC.

PROCEDURE:

NOTE: OSCILLOGRAPH AMPLIFIER sensitivities stated herein are nominal and may be adjusted at the discretion of the operator.

1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Insure that the CH3 AC, CH4 AC, CH5 AC, CH6 AC, 0 PH REF, and OPT

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 AUG 65

800~ PH GEN pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

3. Set the CHANNEL 2 and 6 switches on the OSCILLOGRAPH SIGNAL SELECTOR panel to 12, CHANNEL 3 and 5 switches to 11, and monitor the following signals:

a. SXT Trunnion MDA Input at 56P9 pins 73 (high) and 56 (low) on CHANNEL 6.

b. SXT Trunnion Tach Feedback at 56P9 pins 21 (high) and 56 (low) on CHANNEL 2.

c. CDU Trunnion Tach Feedback at 56P9 pins 22 (high) and 56 (low) on CHANNEL 3.

d. SCT Trunnion Tach Feedback at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

4. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS.

5. Press CHART SPEEDS 5 pushbutton on the OSCILLOGRAPH CONTROL panel and set CHANNEL 2, 3, 5 and 6 sensitivities on OSCILLOGRAPH AMPLIFIER panel to 500 mv/mm.

6. Set SCOPE "A" INPUT to SIG 2 and CROSSBAR CONTROL to 14 on PRIMARY SIGNAL SELECTOR panel to monitor the SXT Trunnion MDA Output at 45A8J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

7. Set the CONTROLLER MODE switch to DIRECT, CONTROLLER SPEED to HI, and after the ZERO ENCODER condition lamp goes out OPTICS MODE switch to MANUAL on the G & N indicator control panel.

8. Start OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

9. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the upper limit not longer than 10 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indications of CHANNELS 2, 3, 5 and 6.

10. Set VOLTMETER INPUT to DVM SIG 2 and CROSSBAR CONTROL to 99. Set DVM FUNCTION switch to AC and use dc probes to monitor SXT Trunnion MDA Input at 45A8J1 pins 2 (high) and 1 (low).

11. Measure and record the total rms voltage indicated on the DVM while holding the control stick to the lower limit not longer than 10 seconds. Release control stick, and set OPTICS MODE switch to ZERO OPTICS.

12. Set CHANNEL 1, 2 and 3 switches to 13 and CHANNEL 6 switch to 10 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals:

a. SCT Shaft Tach Feedback at 56P9 pins 58 (high) and 56 (low) on CHANNEL 1.

b. SXT Shaft MDA input at 56P9 pins 74 (high) and 56 (low) on CHANNEL 2.

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c. CDU Shaft Tach Feedback at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.

d. SXT Shaft Tach Feedback at 56P9 pins 57 (high) and 56 (low) on CHANNEL 6.

13. Set CHANNEL 1, 2, 3 and 6 sensitivities on OSCILLOGRAPH AMPLIFIER panel to 500 mv/mm.

14. Set SCOPE "A" INPUT to SIG 1 and CROSSBAR CONTROL to 14 on PRIMARY SIGNAL SELECTOR panel to monitor the SXT Shaft MDA Output at 45A8J1, pins 27 (high) and 28 (low) on the OSCILLOSCOPE.

15. After the ZERO ENCODER condition lamp goes out set the OPTICS MODE switch to MANUAL on the G & N indicator control panel. Start the OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

16. Measure and record the peak to peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the right limit not longer than 10 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record the maximum steady state indications of CHANNELS 1, 2, 3 and 6.

17. Set VOLTMETER INPUT to DVM SIG 2 and CROSSBAR CONTROL to 99. Set DVM FUNCTION switch to AC and use dc probes to monitor SXT Shaft MDA Input at 45A8J1 pins 9 (high) and 23 (low).

18. Measure and record the total rms voltage indicated on the DVM while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch to ZERO OPTICS.

19. Set CHANNEL 1 and 3 switches to 11 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals.

a. CDU Trunnion 16X rsvr error at 56P9 pins 19 (high) and 56 (low) on CHANNEL 1.

b. CDU Trunnion Tach Feedback at 56P9 pins 22 (high) and 56 (low) on CHANNEL 3.

20. Set CHANNEL 1 sensitivity to 2 MV/MM and CHANNEL 3 sensitivity to 50 MV/MM and press CHART SPEEDS 20 pushbutton on the OSCILLOGRAPH CONTROL panel.

21. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 09. Set PAVM FUNCTION selector to 0° to monitor in phase voltage of the SCT Trunnion 1X rsvr error at 45A9J1 pins 9 (high) and 23 (low).

22. Set the CONTROLLER SPEED to MED and after the ZERO ENCODER condition lamp goes out set the OPTICS MODE switch to MANUAL on the G & N indicator control panel.

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23. Start OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

24. Measure and record the voltage indicated on the PAVM while holding the control stick to the upper limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record steady state indication per Figure 1 of CHANNELS 1 and 3. Record maximum width of any pulses at 1/2 positive peak or 1/2 negative peak points on CHANNELS 1 and 3 per Figure 1.

25. Set CHANNEL 4 switch to 12 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the SCT Trunnion 1X rsvr error at 56P9 pins 37 (high) and 56 (low).

26. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SXT Trunnion Tach Feedback at 45A8J1 pins 10 (high) and 11 (low).

27. Set CHANNEL 4 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

28. Measure and record the voltage indicated on the PAVM while holding the control stick to the lower limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record steady state indication per Figure 1 of CHANNEL 4. Record maximum width of any pulses at 1/2 positive peak or 1/2 negative peak points on CHANNEL 4 per Figure 1.

29. Set OPTICS MODE switch to ZERO OPTICS.

30. Set CHANNEL 3 switch to 13 and CHANNEL 5 switch to 10 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following voltages:

a. CDU Shaft Tach Feedback at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.

b. CDU Shaft 16X rsvr error at 56P9 pins 20 (high) and 56 (low) on CHANNEL 5.

31. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Shaft 1X rsvr error at 45A8J1 pins 3 (high) and 12 (low).

32. Set CHANNEL 3 sensitivity to 50 MV/MM and CHANNEL 5 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel.

33. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch on G & N indicator control panel to MANUAL and CHART DRIVE switch to MM/SEC.

34. Measure and record the voltage indicated on the PAVM while holding the control stick to the right limit not longer than 20 seconds. Release control stick and set

seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record steady state indication per Figure 1 of CHANNELS 3 and 5. Record maximum width of any pulses at 1/2 positive peak or 1/2 negative peak points on CHANNEL 3 and 5 per Figure 1.

35. Set CHANNEL 4 switch to 13 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the SCT Shaft 1X rsvr error at 56P9 pins 38 (high) and 56 (low).

36. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SXT Shaft Tach Feedback at 45A8J1 pins 17 (high) and 24 (low).

37. Set CHANNEL 4 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

38. Measure and record the voltage indicated on the PAVM while holding the control stick to the left limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record steady state indication of CHANNEL 4 per Figure 1. Record maximum width of any pulses at 1/2 positive peak or 1/2 negative peak points on CHANNEL 4 per Figure 1.

39. Set OPTICS MODE switch to ZERO OPTICS and CONTROLLER SPEED to LO on G & N indicator control panel.

40. Set CHANNEL 1 switch to 11 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the CDU Trunnion 16X rsvr error at 56P9 pins 19 (high) and 56 (low).

41. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL TO 08, to monitor the CDU Trunnion Tach Feedback at 45A9J1 pins 10 (high) and 11 (low).

42. Set CHANNEL 1 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

43. Set OPTICS MODE switch on the G & N Indicator Control panel to MANUAL after ZERO ENCODER condition lamp goes out.

44. Measure and record the voltage indicated on the PAVM while holding the control stick to the upper limit until 2X trunnion CDU dial stops moving. (SXT against stop.) Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record steady state indication of CHANNEL 1 per Figure 1. Record maximum width of any pulses at 1/2 positive peak or 1/2 negative peak points on CHANNEL 1 per Figure 1.

45. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Trunnion Tach Feedback at 45A9J1 pins 3 (high) and 12 (low).

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45. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Trunnion Tach Feedback at 45A9J1 pins 3 (high) and 12 (low).

46. Measure and record the voltage indicated on the PAVM while holding the control stick to the lower limit until 2X trunnion CDU dial stops moving. (SXT against stop.) Release control stick and set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS.

47. Set CHANNEL 5 switch to 10 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor CDU Shaft 16X rsvr error at 56P9 pins 20 (high) and 56 (low).

48. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor CDU Shaft Tach feedback at 45A9J1 pins (2) high) and 1 (low).

49. Set CHANNEL 5 sensitivity to 1 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

50. After ZERO ENCODER condition lamp goes out, set OPTICS MODE switch on the G & N Indicator Control panel to MANUAL.

51. Measure and record the voltage indicated on the PAVM while holding the control stick to the right limit until shaft CDU dial stops moving. (SXT against stop.) Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER to OFF and record steady state indication of CHANNEL 5 per Figure 1. Record maximum width of any pulses at 1/2 positive peak or 1/2 negative peak points of CHANNEL 5 per Figure 1.

52. Set all CHANNEL switch to OFF on OSCILLOGRAPH SIGNAL SELECTOR panel.

53. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 07 to monitor SCT Shaft Tach Feedback at 45A8J1 pins 18 (high) and 19 (low).

54. Measure and record the voltage indicated on the PAVM while holding the control stick to the left limit until shaft CDU dial stops moving. (SXT against stop.) Release control stick and set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS.

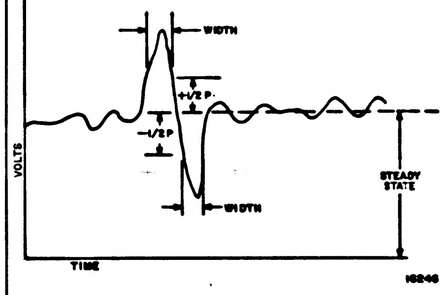

Figure 1. Signal Characteristics Diagram

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 4

JDC
NO. 10041
REV. E
INITIAL TDRR 21539

JOB OPTICS SLEW RATE TEST

ASSEMBLY UNDER TEST

TITLE
SER. NO. DWG REV.

TEST HISTORY

DATE START END SITE / LOCATION
TIME START END TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME SER. NO. CAL DATE
NAME SER. NO. CAL DATE

CONDUCTED BY NAME/AFFILIATION APPROVED BY NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
9	SXT TRN TACH FEEDBACK SMC	V rms	7.4				9.9		
	CDU TRN TACH FEEDBACK SMC	V rms	7.4				9.9		
	SCT TRN TACH FEEDBACK SMC	V rms	3.7				4.9		
	SXT TRN MDA INPUT SMC	V rms	9.0				12.0		
	SXT TRN MDA OUTPUT PSA	V p-p	10				25		
11	SXT TRN MDA INPUT PSA	V rms	9.0				12.0		
16	SXT SHAFT MDA OUTPUT PSA	V p-p	15				25		
	SCT SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
	SXT SHAFT MDA INPUT SMC	V rms	9.0				12.0		

* TO BE USED AS REQUIRED OR DESIRED

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 4

JDC
NO. 10041
REV. E

JOB OPTICS SLEW RATE TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
16 (cont)	CDU SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
	SXT SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
18	SXT SHAFT MDA INPUT PSA	V rms	9.0				12.0		
24	SCT TRN 1X RSVR ERROR PSA	V rms	0.0				0.01		
	CDU TRN 16X RSVR ERROR SMC	V rms	0.0				0.01		
	CDU TRN 16X RSVR ERROR SMC PULSE WIDTH	m. sec.	▨				200		
	CDU TRN TACH FEEDBACK SMC	V rms	0.85				1.25		
	CDU TRN TACH FEEDBACK SMC PULSE WIDTH	m.sec.	▨				200		
28	SXT TRN TACH FEEDBACK PSA	V rms	0.85				1.25		
	SCT TRN 1X RSVR ERROR SMC	V rms	0.0				0.01		
	SCT TRN 1X RSVR ERROR SMC PULSE WIDTH	m.sec.	▨				200		

* TO BE USED AS REQUIRED OR DESIRED

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 4

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JOB OPTICS SLEW RATE TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
34	SCT SHAFT 1X RSVR ERROR PSA	V rms	0.0				0.02		
	CDU SHAFT TACH FEEDBACK SMC	V rms	0.85				1.25		
	CDU SHAFT TACH FEEDBACK SMC PULSE WIDTH	m.sec.	▨				200		
	CDU SHAFT 16X RSVR ERROR SMC	V rms	0.0				0.01		
	CDU SHAFT 16X RSVR ERROR SMC PULSE WIDTH	m.sec.	▨				200		
38	SXT SHAFT TACH FEEDBACK PSA	V rms	0.85				1.25		
	SCT SHAFT 1X RSVR ERROR SMC	V rms	0.0				0.02		
	SCT SHAFT 1X RSVR ERROR SMC PULSE WIDTH	m.sec.	▨				200		
44	CDU TRN TACH FEEDBACK PSA	V rms	0.085				0.125		
	CDU TRN 16X RSVR ERROR SMC	V rms	0.0				0.01		
	CDU SHAFT 16X RSVR ERROR SMC PULSE WIDTH	m. sec.	▨				250		
46	SCT TRN TACH FEEDBACK PSA	V rms	0.042				0.065		

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 4

JDC
NO. 10041
REV. E

JOB OPTICS SLEW RATE TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
51	CDU SHAFT TACH FEEDBACK PSA	V rms	0.085				0.125		
	CDU SHAFT 16X RSVR ERROR SMC	V rms	0.0				0.01		
	CDU SHAFT 16X RSVR ERROR SMC PULSE WIDTH	m.sec.	▨				250		
54	SCT SHAFT TACH FEEDBACK PSA	V rms	0.085				0.125		

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

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JOB OPTICS SLEW RATE TEST
INITIAL TDRR ________ D.S. PGS 2

SUBSYSTEM G AND N SYSTEM
ASSY.

DESCRIPTION

The test demonstrates slewing performance of the optics servo loops.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
See below.

IMPORTANT
See Below.

INTERVAL

TOOLS AND MATERIAL
Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.8.3, 3-3.11.2.104 thru 3-3.11.2.106, 3-3.11.2.108, 3-3.11.2.109, 3-3.11.2.118 thru 3-3.11.2.120, 3-3.11.3.53, 3-3.11.3.54, 3-3.11.3.58, 3-3,11.3.64, 3-3.11.3.65, and 3-3.11.3.70 thru 3-3.11.3.72 of ATP 1026000.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted perform JDC 10008, Part III, before preceeding with this JDC.

PROCEDURE:

NOTE: OSCILLOGRAPH AMPLIFIER sensitivities stated herein are nominal and may be adjusted at the discretion of the operator.

1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACKER POWER switch is set to OFF, and the TRACK pushbutton lamp is not lighted.

2. Insure that the CH 3 AC, CH 4 AC, CH 5 AC, CH 6 AC, 0 PH REF, and OPT 800 PH GEN pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.

3. Set the CHANNEL 2 and 6 switches to 12 and CHANNEL 3 and 5 switches to 11 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals:

a. SXT Trunnion MDA Input at 56P9 pins 73 (high) and 56 (low) on CHANNEL 6.

b. SXT Trunnion Tach Feedback at 56P9 pins 21 (high) and 56 (low) on CHANNEL 2.

c. CDU Trunnion Tach Feedback at 56P9 pins 22 (high) and 56 (low) on CHANNEL 3.

d. SCT Trunnion Tach Feedback at 56P9 pins 40 (high) and 56 (low) on CHANNEL 5.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

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4. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS.

5. Press CHART SPEEDS 5 pushbutton on the OSCILLOGRAPH CONTROL panel and set CHANNEL 2, 3, 5 and 6 sensitivities on OSCILLOGRAPH AMPLIFIER panel to 500mv/mm.

6. Set SCOPE "A" INPUT to SIG 2 and CROSSBAR CONTROL to 14 on PRIMARY SIGNAL SELECTOR panel to monitor the SXT Trunnion MDA Output at 45A8J1 pins 20 (high) and 21 (low) on the OSCILLOSCOPE.

7. Set the CONTROLLER MODE switch to DIRECT, CONTROLLER SPEED to HI, and OPTICS MODE switch to MANUAL on the G & N indicator control panel.

8. Start OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

9. Measure and record the peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the upper limit not longer than 10 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indications of CHANNELS 2, 3, 5 and 6.

10. Set VOLTMETER INPUT to DVM SIG 2 and CROSSBAR CONTROL to 99. Set DVM FUNCTION switch to AC and use dc probes to monitor SXT Trunnion MDA Input at 45A8J1 pins 2 (high) and 1 (low).

11. Measure and record the total rms voltage indicated on the DVM while holding the control stick to the lower limit not longer than 10 seconds. Release control stick, and set OPTICS MODE switch to ZERO OPTICS.

12. Set CHANNEL 1, 2 and 3 switches to 13 and CHANNEL 6 switch to 10 on the OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals:

a. SCT Shaft Tach Feedback at 56P9 pins 58 (high) and 56 (low) on CHANNEL 1.

b. SXT Shaft MDA input at 56P9 pins 74 (high) and 56 (low) on CHANNEL 2.

c. CDU Shaft Tach Feedback at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.

d. SXT Shaft Tach Feedback at 56P9 pins 57 (high) and 56 (low) on CHANNEL 6.

13. Set CHANNEL 1, 2, 3 and 6 sensitivities on OSCILLOGRAPH AMPLIFIER panel to 500 mv/mm.

14. Set SCOPE "A" INPUT to SIG 1 and CROSSBAR CONTROL to 14 on PRIMARY SIGNAL SELECTOR panel to monitor the SXT Shaft MDA Output at 45A8J1, pins 27 (high) and 28 (low) on the OSCILLOSCOPE.

15. Set the OPTICS MODE switch to MANUAL on the G & N indicator control panel. Start the OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

16. Measure and record the peak voltage indicated on the OSCILLOSCOPE while holding the control stick to the right limit not longer than 10 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record the maximum steady state indications of CHANNELS 1, 2, 3 and 6.

17. Set VOLTMETER INPUT to DVM SIG 2 and CROSSBAR CONTROL to 99. Set DVM FUNCTION switch to AC and use dc probes to monitor SXT Shaft MDA input at 45A8J1 pins 9 (high) and 23 (low).

18. Measure and record the total rms voltage indicated on the DVM while holding the control stick to the left limit not longer than 10 seconds. Release control stick and set OPTICS MODE switch to ZERO OPTICS.

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19. Set CHANNEL 1 and 3 switches to 11 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following signals.

a. CDU Trunnion 16X rsvr error at 56P9 pins 19 (high) and 56 (low) on CHANNEL 1.

b. CDU Trunnion Tach Feedback at 56P9 pins 22 (high) and 56 (low) on CHANNEL 3.

20. Set CHANNEL 1 sensitivity to 2MV/MM and CHANNEL 3 sensitivity to 50 MV/MM.

21. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 09. Set PAVM FUNCTION selector to 0° to monitor in phase voltage of the SCT Trunnion 1X rsvr error at 45A9J1 pins 9 (high) and 23 (low).

22. Set the CONTROLLER SPEED to MED and after the ZERO ENCODER condition lamp goes out set the OPTICS MODE switch to MANUAL on the G & N indicator control panel.

23. Start OSCILLOGRAPH by setting CHART DRIVE switch on OSCILLOGRAPH CONTROL panel to MM/SEC.

24. Measure and record the voltage indicated on the PAVM while holding the control stick to the upper limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indications of CHANNELS 1 and 3.

25. Set CHANNEL 4 switch to 12 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the SCT Trunnion 1X rsvr error at 56P9 pins 37 (high) and 56 (low).

26. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SXT Trunnion Tach Feedback at 4585J1 pins 10 (high) and 11 (low).

27. Set CHANNEL 4 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

28. Measure and record the voltage indicated on the PAVM while holding the control stick to the lower limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNEL 4.

29. Set OPTICS MODE switch to ZERO OPTICS.

30. Set CHANNEL 3 switch to 13 and CHANNEL 5 switch to 10 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the following voltages.

a. CDU Shaft Tach Feedback at 56P9 pins 39 (high) and 56 (low) on CHANNEL 3.

b. CDU Shaft 16X rsvr error at 56P9 pins 20 (high) and 56 (low) on CHANNEL 5.

31. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Shaft 1X rsvr error at 45A8J1 pins 3 (high) and 12 (low).

32. Set CHANNEL 3 sensitivity to 50 MV/MM and CHANNEL 5 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel.

33. After the ZERO ENCODER condition lamp goes out, set OPTICS MODE switch on G & N indicator control panel to MANUAL and CHART DRIVE switch to MM/SEC.

34. Measure and record the voltage indicated on the PAVM while holding the control stick to the right limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNELS 3 and 5.

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35. Set CHANNEL 4 switch to 13 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the SCT Shaft 1X rsvr error at 56P9 pins 38 (high) and 56 (low).

36. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SXT Shaft Tach Feedback at 45A8J1 pins 17 (high) and 24 (low).

37. Set CHANNEL 4 sensitivity to 2 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

38. Measure and record the voltage indicated on the PAVM while holding the control stick to the left limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNEL 4.

39. Set OPTICS MODE switch to ZERO OPTICS and CONTROLLER SPEED to LO on G & N indicator control panel.

40. Set CHANNEL 1 switch to 11 on OSCILLOGRAPH SIGNAL SELECTOR panel to monitor the CDU Trunnion 16X rsvr error at 56P9 pins 19 (high) and 56 (low).

41. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL TO 08, to monitor the CDU Trunnion Tach Feedback at 45A9J1 pins 10 (high) and 11 (low).

42. Set CHANNEL 1 sensitivity to 1 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

43. Set OPTICS MODE switch to MANUAL after ZERO ENCODER condition lamp goes out.

44. Measure and record the voltage indicated on the PAVM while holding the control stick to the upper limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER panel to OFF and record maximum steady state indication of CHANNEL 1.

45. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor the SCT Trunnion Tach Feedback at 45A9J1 pins 3 (high) and 12 (low).

46. Measure and record the voltage indicated on the PAVM while holding the control stick to the lower limit not longer than 20 seconds. Release control stick and set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS.

47. Set CHANNEL 5 switch to 10 on OSCILLOGRAPH SIGNAL SELECTOR to monitor CDU Shaft 16X rsvr error at 56P9 pins 20 (high) and 56 (low).

48. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 99. Use ac probes to monitor CDU Shaft Tach Feedback at 45A9J1 pins 2 (high) and 1 (low).

49. Set CHANNEL 5 sensitivity to 1 MV/MM on OSCILLOGRAPH AMPLIFIER panel and set CHART DRIVE switch to MM/SEC.

50. After ZERO ENCODER condition lamp goes out, set OPTICS MODE switch to MANUAL.

51. Measure and record the voltage indicated on the PAVM while holding the control stick to the right limit not longer than 20 seconds. Release control stick and set CHART DRIVE switch to OFF. Set all sensitivities on OSCILLOGRAPH AMPLIFIER to OFF and record maximum steady state indication of CHANNEL 5.

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SUBSYSTEM G AND N SYSTEM | **ASSY**

52. Set all CHANNEL switches to OFF on OSCILLOGRAPH SIGNAL SELECTOR panel.

53. Set VOLTMETER INPUT to PAVM SIG 1 and CROSSBAR CONTROL to 07 to monitor SCT Shaft Tach Feedback at 45A8J1 pins 18 (high) and 19 (low).

54. Measure and record the voltage indicated on the PAVM while holding the control stick to the left limit not longer than 20 seconds. Release control stick and set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS.

DATE ________

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

JDC
NO. 10041
REV. ________

JOB OPTICS SLEW RATE TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES 1st	2nd*	3rd*	MAX VALUE	REJ	ACC
9	SXT TRN TACH FEEDBACK SMC	Vrms	7.4				9.9		
	CDU TRN TACH FEEDBACK SMC	V rms	7.4				9.9		
	SCT TRN TACH FEEDBACK SMC	V rms	7.4				9.9		
	SXT TRN MDA INPUT SMC	V rms	9.0				12.0		
	SXT TRN MDA OUTPUT PSA	V p-p	15				25		
11	SXT TRN MDA INPUT PSA	V rms	9.0				12.0		
16	SXT SHAFT MDA OUTPUT PSA	V p-p	15				25		
	SCT SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
	SXT SHAFT MDA INPUT SMC	V rms	9.0				12.0		
	CDU SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
	SXT SHAFT TACH FEEDBACK SMC	V rms	7.4				9.9		
18	SXT SHAFT MDA INPUT PSA	V rms	9.0				12.0		
24	SCT TRN 1X RSVR ERROR PSA	V rms	0.0				0.01		
	CDU TRN 16X RSVR ERROR SMC	V rms	0.0				0.01		

*** TO BE USED AS REQUIRED OR DESIRED**

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 2

JDC
NO. 10041
REV. ________

JOB OPTICS SLEW RATE TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES 1st	2nd*	3rd*	MAX VALUE	REJ	ACC
24	CDU TRN TACH FEEDBACK SMC	V rms	0.85				1.25		
28	SXT TRN TACH FEEDBACK PSA	V rms	0.85				1.25		
	SCT TRN 1X RSVR ERROR SMC	V rms	0.0				0.01		
34	SCT SHAFT 1X RSVR ERROR PSA	V rms	0.0				0.02		
	CDU SHAFT TACH FEEDBACK SMC	V rms	0.85				1.25		
	CDU SHAFT 16X RSVR ERROR SMC	V rms	0.0				0.01		
38	SXT SHAFT TACH FEEDBACK PSA	V rms	0.85				1.25		
	SCT SHAFT 1X RSVR ERROR SMC	V rms	0.0				0.02		
44	CDU TRN TACH FEEDBACK PSA	V rms	0.085				0.125		
	CDU TRN 16X RSVR ERROR SMC	V rms	0.0				0.01		
46	SCT TRN TACH FEEDBACK PSA	V rms	0.085				0.125		
51	CDU SHAFT TACH FEEDBACK PSA	V rms	0.085				0.125		
	CDU SHAFT 16X RSVR ERROR SMC	V rms	0.0				0.01		
54	SCT SHAFT TACH FEEDBACK PSA	V rms	0.085				0.125		

*** TO BE USED AS REQUIRED OR DESIRED**

DATE ________

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JOB OPTICS COORDINATE TRANSFORMATION CONTROL TEST

JDC 10042 **REV.** - **PAGE** 1 **OF** 2

INITIAL TDRR ______ **D.S. PGS** 1

SUBSYSTEM G AND N SYSTEM

ASSY.

DESCRIPTION

The test demonstrates the operation of the cosecant circuit, resolution of the control stick, and slewing of the optics in the resolved mode.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES
Paragraph 3-3.4.4.2 of ATP 1026000

IMPORTANT
See Below.

INTERVAL

TOOLS AND MATERIAL Per Paragraph 3-2 of ATP 1026000

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interruped, perform JDC 10008, Part III before proceeding with this JDC.

NOTE: The G&N Mounting Fixture shall be set at the 0.0° position.

1. Insure that the SLAVE TELESCOPE switch on the G and N indicator control panel is set to STAR LOS, the TRACK pushbutton lamp is not lighted and the TRACKER POWER switch is set to OFF.
2. Insure that the CH5 AC, OPT 800 PH GEN, and 0 PH REF pushbuttons on the OSCILLOGRAPH SIGNAL SELECTOR panel are lighted.
3. Set the CHANNEL 5 switch on the OSCILLOGRAPH SIGNAL SELECTOR panel to 11 and monitor the SCT Trunnion Tach Feedback voltage at 56P9 pins 40 (high) and 56 (low).
4. Press CHART SPEEDS 5 pushbutton on the OSCILLOGRAPH CONTROL panel.
5. Set the CONTROLLER MODE switch on the G and N indicator control panel to DIRECT.
6. Set the OPTICS MODE switch on the G and N indicator control panel to ZERO OPTICS and after one minute return switch to MANUAL.
7. Using the control stick, drive the optics to the position where the SHAFT ANGLE CDU reads 225.000° and the 2X TRUNNION CDU reads 10.000°.
8. Sight through the SCT eyepiece and center a convient laboratory object (object #1) on the SCT reticle pattern.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB OPTICS COORDINATE TRANSFORMATION CONTROL TEST

JDC 10042 **REV** - **PAGE** 2 **OF** 2

SUBSYSTEM G AND N SYSTEM

ASSY

9. Set the CONTROLLER MODE switch on the G and N indicator control panel to RESOLVED and CONTROLLER SPEED switch to MED.

   NOTE: Read and understand steps 10 and 11 before proceeding.

10. Set CHANNEL 5 sensitivity on OSCILLOGRAPH AMPLIFIER panel to 5 MV/MM. Start the OSCILLOGRAPH by setting the CHART DRIVE switch on the OSCILLOGRAPH CONTROL panel to MM/SEC.
11. Quickly displace the control stick 45 degrees in the upper right hand quadrant while sighting through the SCT eyepiece. Release control stick and press the EVENT MARKER pushbutton on the OSCILLOGRAPH CONTROL panel when the object #1 leaves the SCT upper right field of view. Simultaneously stop and hold SHAFT ANGLE CDU rotation by pressing thumb on thumbwheel and record indication.
12. Stop OSCILLOGRAPH and record the elapsed time between the rise of the SCT Trunnion Tach Feedback voltage and the EVENT MARKER indication on the OSCILLOGRAPH chart.
13. Set the CONTROLLER MODE switch on the G and N indicator control panel to DIRECT.
14. Set OPTICS MODE switch on the G and N indicator control panel to ZERO OPTICS.

DATE ______

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

JDC NO. 10042
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INITIAL TDRR ______

JOB OPTICS COORDINATE TRANSFORMATION CONTROL TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ **DWG** ______ **REV.** ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ **SER. NO.** ______ ______ CAL DATE
NAME ______ **SER. NO.** ______ ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION **APPROVED BY** ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
11	SHAFT ANGLE CDU	deg.	215.000		235.000		
12	Time	sec.	24		36		

DATE ______

JDC 10043 REV. A PAGE 1 OF 8
INITIAL TDRR 21539 D.S. PGS 13

JOB OPTICS POSITIONAL ACCURACY TEST

SUBSYSTEM G & N SYSTEM
ASSY.

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and SXT slew characteristics in the COMPUTER mode are checked in this test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-28-65	22832	ALL	ALL	WK	WM

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1026000

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000 and Data Sheets 10043, and 10003.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

Data from JDC 10003 must be made available before proceeding with this JDC.

NOTE: The G & N Mounting Fixture shall be set at 0.0° position.

1. Insure that the SLAVE TELESCOPE switch on the G & N indicator control panel is set to STAR LOS and that the TRACK pushbutton lamp is not lighted and the TRACKER POWER switch is OFF.

2. Set the CONTROLLER MODE switch on the G & N indicator control panel to DIRECT and the CONTROLLER SPEED switch to HI.

3. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS and after one minute, record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.

4. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident with dot and horizontal reticle line of target #1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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5. Set OPTICS MODE switch to MANUAL. Pushing the control stick to the right, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Set the CONTROLLER SPEED switch on the G & N indicator control panel to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU reads 270.000° and the 2X TRUNNION CDU reads the value recorded in step 3 line (a).

6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.

7. 2X TRUNNION CDU reading of step 3 line (a) and SHAFT ANGLE CDU reading of 270.000° by manipulating control stick. Record VDW reading in line (e) of Data Sheet. Complete lines (d), (f) and (g) of Data Sheet.

8. Manipulate the control stick to position the SXT until the SHAFT ANGLE CDU indicates approximately 180.0° and the 2X TRUNNION CDU indicates approximately 000.0°.

9. Sight through SCT eyepiece and manipulate the control stick until central dot on reticle of target #2 is aligned to horizontal crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS. Wait one minute before proceeding.

12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeroes). Set OPTICS MODE switch to MANUAL.

13. Complete lines (p) (q) and (r) of Data Sheet. Set the CONTROLLER SPEED switch to HI.

14. Repeat step 5.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000°. Return the CONTROLLER SPEED switch to LO.

19. Manipulate the control stick vertically to position the SXT StLOS until central dot

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on reticle of target #3 approaches the vertical crosshair on the SXT reticle. At the instant of coincidence, simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel.

NOTE: VERB 06, NOUN 56 shall appear on G & N AGC DSKY indicating optical CDU and time displays.

20. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (s) of Data Sheet. Release thumbwheel. Repeat step 19 two more times, recording the DSKY R2 inditon and TRUNNION CDU for each MARK.

21. Observe the three bit counts of line (s) of Data Sheet. If two of the three counts are equal, record this count in line (t). If all three counts are different, record the count which falls between the smallest and the largest on line (t).

22. Record the TRUNNION CDU value from line (s) which corresponds to line (t) in line (u).

23. Complete lines (x) and (y) of Data Sheet.

24. Set VDW to value recorded in line (y) of Data Sheet.

25. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 approaches the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

26. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (z) of Data Sheet. Release thumbwheel. Repeat step 25 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

27. Observe the three bit counts of line (z) of Data Sheet. If two of the three counts are equal, record this count in line (aa). If all three counts are different, record the count which falls between the smallest and the largest in line (aa).

28. Record the TRUNNION CDU value from line (z) which corresponds to line (aa) in line (ab).

29. Complete lines (ae), (af), (ag), (ah), (ak), and (al) of Data Sheet.

30. Set VDW to value recorded in line (al) of Data Sheet.

31. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the verticle crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

32. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (am) of Data Sheet. Release thumbwheel. Repeat

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step 31 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

33. Observe the three bit counts of line (am) of Data Sheet. If two of the three counts are equal, record this count in line (an). If all three counts are different, record the count which falls between the smallest and the largest in line (an).

34. Record TRUNNION CDU value from line (am) which corresponds to line (an) in line (ao).

35. Complete lines (ar), (as), (at), (au), (av) and (aw) of Data Sheet.

36. Set VDW to value recorded in line (aw) of Data Sheet.

37. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

38. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (ax) of Data Sheet. Release thumbwheel. Repeat step 37 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

39. Observe the three bit counts of line (ax) of Data Sheet. If two of the three counts are equal, record this count in line (ay). If all three counts are different, record the count which falls between the smallest and the largest in line (ay).

40. Record the TRUNNION CDU value from line (ax) which corresponds to line (ay) in line (az).

41. Complete lines (bc), (bd), (be), (bf), (bg), and (bh) of Data Sheet.

42. Set VDW to value recorded in line (bh) of Data Sheet.

43. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

44. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bk) of Data Sheet. Release thumbwheel. Repeat step 43 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

45. Observe the three bit counts of line (bk) of Data Sheet. If two of the three counts are equal, record this count in line (bl). If all three counts are different, record the count which falls between the smallest and the largest in line (bl).

46. Record the TRUNNION CDU value from line (bk) which corresponds to line (bl) in line (bm).

47. Complete lines (bp), (bq), (br), (bs), (bt), and (bu) of Data Sheet.

48. Set VDW to value recorded in line (bu) of Data Sheet.

49. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

50. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bv) of Data Sheet. Repeat step 49 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

51. Observe the three bit counts of line (bv) of Data Sheet. If two of the three counts are equal, record this count in line (bw). If all three counts are different, record the count which falls between the smallest and the largest in line (bw).

52. Record the TRUNNION CDU value from line (bv) which corresponds to line (bw) in line (bx).

53. Complete lines (ca), (cb), (cc), (cd), (ce) and (cf) of Data Sheet.

54. Set VDW to value recorded in line (cf) of Data Sheet.

55. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

56. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (cg) of Data Sheet. Repeat step 55 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

57. Observe the three bit counts of line (cg) of Data Sheet. If two of the three counts are equal, record this count in line (ch). If all three counts are different, record the count which falls between the smallest and the largest in line (ch).

58. Record the TRUNNION CDU value from line (cg) which corresponds to line (ch) in line (ck).

59. Complete lines (cn), (co), (cp), and (cq) of Data Sheet.

60. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes OUT, return switch to MANUAL.

61. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Return the CONTROLLER SPEED switch to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU indicates 270.000°.

62. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N Mounting Fixture cradle.

63. Sight through the SXT StLOS and, using the control stick, position the approximate center of the SXT StLOS reticle

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pattern to the number 10 resolution pattern of target #1.

64. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

65. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

66. Sight through the SCT LOS and, using the control stick, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

67. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

68. Set OPTICS MODE switch on G & N indicator panel to ZERO OPTICS. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFF-SET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT vertical reticle line.

69. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

70. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.

71. Set OPTICS MODE switch on G & N indicator control panel to MANUAL.

72. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000° and the SHAFT ANGLE CDU reads 270.000°. (Do not drive through 180.000°.) Return the CONTROLLER SPEED switch to LO and while sighting through the SXT eyepiece, use the control stick to drive the StLOS until the center of the SXT reticle pattern approaches the reticle dot of target #3. At the instant of coincidence press MARK pushbutton.

73. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cu) of Data Sheet.

74. Monitor TRUNNION CDU unconditioned square wave $-\Delta\theta$ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

75. Set following controls on PRIMARY SIGNAL SELECTOR panel:

COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
DIGITAL RECORDER SELECTOR to CTR.

77. Set the following controls on COUNTER:

SAMPLE TIME (N_1) to 002548
CLOCK FREQUENCY DIVIDER to 10
DISPLAY RESET to ZERO
CLOCK SELECTOR to INT
FUNCTION to Ratio or Period
INPUT SELECTOR to C SENSE

SENSE SELECTOR to FWD
ATTEN D to 10 AC
SLOPE to +
TRIGGER VOLTAGE - As required.

77. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter VERB 21, NOUN 01, press ENTER pushbutton. Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

78. Set the OPTICS MODE switch on G & N indicator control panel to COMPUTER.

79. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

80. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

81. Monitor SHAFT CDU unconditioned square wave $-\Delta\theta$ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N_1) on COUNTER to 002913.

82. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

83. Enter R1 from step 73 into G & N AGC DSKY. Press ENTER pushbutton. Enter R2 from step 73 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

84. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

85. Sight through SXT eyepiece. The center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cx) of Data Sheet.

86. Perform calculations (cy) and (cz) on Data Sheet.

87. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in-phase signals on the PAVM:

a. SXT shaft MDA input at 45A8J1 pins 9 (high) and 23 (low)
b. SXT trunnion MDA input at 45A8J1 pins 2 (high) and 1 (low)

Record indications in lines (da) and (db) of Data Sheet.

88. Adjust G & N MOUNTING FIXTURE to approximately +25°.

89. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes out, return switch to COMPUTER.

90. Enter VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

91. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

92. Enter +18000 into row 1 of G & N AGC DSKY. Press ENTER pushbutton. Enter +25000 into row 2 of G & N AGC DSKY. Press ENTER pushbutton.

93. Record the Telescope Panel Angle Counter shaft and trunnion indications on the data sheet.

94. Sight through SXT eyepiece and insure that horizontal reticle line of SXTis coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle.

95. Set the OPTICS MODE switch on G & N indicator control panel to MANUAL. Set the CONTROLLER SPEED switch to LO.

96. Sight through the SCT 1X eyepiece and manipulate the control stick vertically to position the SCT LOS until central horizontal reticle line of SCT approaches the central dot on the reticle of target #2. At the instant of coincidence press MARK pushbutton. Record indication of R2 of G & N AGC DSKY.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 13

JDC
NO. 10043
REV. A
INITIAL TDRR 21539

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
3	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ______	+0.006			(a)
3	Record SHAFT CDU indication	deg	-0.006	( ) ______	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min		______ ______				(c)
7	Convert Line (c) to sec. using Calibration Chart	Sec		( ) ______				(d)
6	Record VDW Reading of WSTLOS	Deg Min		______ ______				(e)
7	Convert Line (e) to sec. using calibration chart	sec		( ) ______				(f)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

DATE 12 AUG 65

APOLLO G & N
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JDC
NO. 10043
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
7	Calculate: Line (f) - Line (d) StLOS-LLOS parallelism	sec	-10	( ) ______	10			(g)
9	Record 2X TRUNNION CDU indication	deg		( ) ______				(h)
9	Record TRUNNION ANGLE indication TRN	deg		( ) ______				(k)
10	Calculate: Line (h) - Line (a) SCT-SXT parallelism	deg	-0.4	( ) ______	+0.4			(m)
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec		______ ______ ______				(n)
13	Calculate: 45° - line (n) to nearest second	Sec		( ) ______				(p)
13	Calculate: Line (p) + Line (d)	Sec		( ) ______				(q)

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 13

JDC
NO. 10043
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
13	Convert Line (q) to VDW reading using calibration chart **	Deg Min		______ ______				(r)
20	Record AGC display * and TRUNNION CDU 45°	CDU TRN ° R2 deg bits		__ __.__ __ __ __ __.__ __ __ ______				(s)
		CDU TRN ° R2 deg bits		__ __.__ __ __ __ __.__ __ __ ______				
		CDU TRN ° R2 deg bits		__ __.__ __ __ __ __.__ __ __ ______				
21	Select bit count 45°	bits	16382	______	16386			(t)
21	CDU TRN 45°	deg		__ __.__ __ __				(u)
23	Calculate: Line (q) + 90 sec	sec		( ) ______				(x)
23	Convert Line (x) to VDW reading using calibration chart	deg min		______ ______				(y)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.
** If line (q) is -, add calibration chart indication to 0°0'.
If line (q) is +, subtract calibration chart indication from 350°60'.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 13

JDC
NO. 10043
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
26	Record AGC display * and TRUNNION CDU 45° (+ 90")	CDU TRN ° R2 deg bits		__ __.__ __ __ __ __.__ __ __ ______				(z)
		CDU TRN ° R2 deg bits		__ __.__ __ __ __ __.__ __ __ ______				
		CDU TRN ° R2 deg bits		__ __.__ __ __ __ __.__ __ __ ______				
27	Select bit count 45° (+ 90")	bits		______				(aa)
27	CDU TRN 45° (+ 90")	deg		__ __.__ __ __				(ab)
29	Calculate: Line (t) + 00009 bits	bits		( ) ______				(ae)
29	Calculate: Line (aa) - Line (ae) G & N Accuracy BITS 45° (+ 90")	bits	-2	( ) ______	+2			(af)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 13

JDC NO. 10043
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Calculate: Line (u) +00.050 deg	deg	▨	( ) ________	▨	▨	▨	(ag)
29	Calculate: Line (ab) - Line (ag) G & N Accuracy CDU 45° (+90")	deg	▨	( ) ________	▨	▨	▨	(ah)
29	Calculate: Line (q) + 30 sec	sec	▨	( ) ________	▨	▨	▨	(ak)
29	Convert Line (ak) to VDW reading using calibration chart	deg min	▨	________ ________	▨	▨	▨	(al)
32	Record AGC display * and TRUNNION CDU 45° (+30")	CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	(am)
		CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	
33	Select bit count 45° (+30")	bits	▨	________	▨	▨	▨	(an)
33	CDU TRN 45° (+30")	deg	▨	— — . — — —	▨	▨	▨	(ao)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 13

JDC NO. 10043
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
35	Calculate: Line (t) +00003 bits	bits	▨	( ) ________	▨	▨	▨	(ar)
35	Calculate: Line (an) - Line (ar) G & N Accuracy BITS 45° (+30")	bits	-2	( ) ________	+2			(as)
35	Calculate: Line (u) +00.017 deg	deg	▨	( ) ________	▨	▨	▨	(at)
35	Calculate: Line (ao) - Line (at) G & N Accuracy CDU 45° (+30")	deg	▨	( ) ________	▨	▨	▨	(au)
35	Calculate: Line (q) +60 sec	sec	▨	( ) ________	▨	▨	▨	(av)
35	Convert Line (av) to VDW reading using calibration chart	deg min	▨	________ ________	▨	▨	▨	(aw)
			▨		▨	▨	▨	

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 13

JDC NO. 10043
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Record AGC display * and TRUNNION CDU 45° (+60")	CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	(ax)
		CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	
39	Select bit count 45° (+60")	bits	▨	________	▨	▨	▨	(ay)
39	CDU TRN 45° (+60")	deg	▨	— — . — — —	▨	▨	▨	(az)
41	Calculate: Line (t) +00006 bits	bits	▨	( ) ________	▨	▨	▨	(bc)
41	Calculate: Line (ay) - Line (bc) G & N Accuracy BITS 45° (+60")	bits	-2	( ) ________	+2			(bd)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 13

JDC NO. 10043
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
41	Calculate: Line (u) +00.033 deg	deg	▨	( ) ________	▨	▨	▨	(be)
41	Calculate: Line (az) - Line (be) G & N Accuracy CDU 45° (+60")	deg	▨	( ) ________	▨	▨	▨	(bf)
41	Calculate: Line (q) - 30 sec	sec	▨	( ) ________	▨	▨	▨	(bg)
41	Convert Line (bg) to VDW reading using calibration chart	deg min	▨	________ ________	▨	▨	▨	(bh)
44	Record AGC display * and TRUNNION CDU 45° (-30")	CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	(bk)
		CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	
45	Select bit count 45° (-30")	bits	▨	________	▨	▨	▨	(bl)
45	CDU TRN 45° (-30")	deg	▨	— — . — — —	▨	▨	▨	(bm)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 13

JDC
NO. 10043
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
47	Calculate: Line (t) -00003 bits	bits	▨	( ) ______	▨	▨	▨	(bp)
47	Calculate: Line (bl) - Line (bp) G & N Accuracy BITS 45° (-30")	bits	-2	( ) ______	+2			(bq)
47	Calculate: Line (u) -00.017 deg	deg	▨	( ) ______	▨	▨	▨	(br)
47	Calculate: Line (bm) -Line (br) G & N Accuracy CDU 45° (-30")	deg	▨	( ) ______	▨	▨	▨	(bs)
47	Calculate: Line (q) -90 sec	sec	▨	( ) ______	▨	▨	▨	(bt)
47	Convert Line (bt) to VDW reading using calibration chart	deg min	▨	______ ______	▨	▨	▨	(bu)
			▨		▨	▨	▨	

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 13

JDC
NO. 10043
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
50	Record AGC display * and TRUNNION CDU 45° (-90")	CDU TRN ° R2 deg bits	▨	—— —— · —— —— —— —— —— · —— —— —— ______	▨	▨	▨	(bv)
		CDU TRN ° R2 deg bits	▨	—— —— · —— —— —— —— —— · —— —— —— ______	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	—— —— · —— —— —— —— —— · —— —— —— ______	▨	▨	▨	
51	Select bit count 45° (-90")	bits	▨	______	▨	▨	▨	(bw)
51	CDU TRN 45° (-90")	deg	▨	—— —— · —— —— ——	▨	▨	▨	(bx)
53	Calculate: Line (t) -00009 bits	bits	▨	( ) ______	▨	▨	▨	(ca)
53	Calculate: Line (bw) - Line (ca) G & N Accuracy BITS 45° (-90")	bits	-2	( ) ______	+2			(cb)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 13

JDC
NO. 10043
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
53	Calculate: Line (u) -00.050 deg	deg	▨	( ) ______	▨	▨	▨	(cc)
53	Calculate: Line (bx) - Line (cc) G & N Accuracy CDU 45° (-90")	deg	▨	( ) ______	▨	▨	▨	(cd)
53	Calculate: Line (q) -60 sec	sec	▨	( ) ______	▨	▨	▨	(ce)
53	Convert Line (ce) to VDW reading using calibration chart	deg min	▨	______ ______	▨	▨	▨	(cf)
56	Record AGC display * and TRUNNION CDU 45° (-60")	CDU TRN ° R2 deg bits	▨	—— —— · —— —— —— —— —— · —— —— —— ______	▨	▨	▨	(cg)
		CDU TRN ° R2 deg bits	▨	—— —— · —— —— —— —— —— · —— —— —— ______	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	—— —— · —— —— —— —— —— · —— —— —— ______	▨	▨	▨	
57	Select bit count 45° (-60")	bits	▨	______	▨	▨	▨	(ch)
57	CDU TRN 45° (-60")	deg	▨	—— —— · —— —— ——	▨	▨	▨	(ck)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 13

JDC
NO. 00043
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	Calculate: Line (t) -00006 bits	bits	▨	( ) ______	▨	▨	▨	(cn)
59	Calculate: Line (ch) - Line (cn) G & N Accuracy BITS 45° (-60")	bits	-2	( ) ______	+2			(co)
59	Calculate: Line (u) -00.033 deg	deg	▨	( ) ______	▨	▨	▨	(cp)
59	Calculate: Line (ck) - Line (cp) G & N Accuracy CDU 45° (-60")	deg	▨	( ) ______	▨	▨	▨	(cq)
68	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cr)
69	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cs)
64 67	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(ct)
73	AGC DSKY indication	R_1 deg R_2 deg	▨	______ ______	▨	▨	▨	(cu)
80	TRUN DAC slew	sec	0	______	14.0			(cv)
83	Shaft DAC slew	sec	0	______	8.0			(cw)
85	AGC DSKY indication	R_1 deg R_2 deg	▨	______ ______	▨	▨	▨	(cx)

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 **OF** 13

JDC
NO. 100-13
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
86	Calculate: Line (cx) R_1 - Line (cu) R_1 (SHAFT)	deg	-.022	( ) ______	+.022			(cy)
86	Calculate: Line (cx) R_2 - Line (cu) R_2 (TRUNNION)	deg	-0.1	( ) ______	+.01			(cz)
87	SXT shaft MDA input	mv	0	______	100			(da)
87	SXT trunnion MDA input	mv	0	______	100			(db)
93	SCT TRUNNION Counter	deg	24.85	( ) ______	25.15			(dc)
93	SCT SHAFT Counter	deg	179.92	( ) ______	180.08			(dd)
94	(SCT) TRUNNION R2 DSKY indication	deg	24.8	______	25.2			(de)

DATE 12 AUG 65

JOB OPTICS POSITIONAL ACCURACY TEST

JDC 10043 **REV.** B **PAGE** 1 **OF** 8
INITIAL TDRR 21539 **D.S. PGS** 13

SUBSYSTEM G & N SYSTEM
ASSY.

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and SXT slew characteristics in the COMPUTER mode are checked in this test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	9-28-65	22832	ALL	ALL	WK	WM
B	12-14-65	24682	2	13	WK	TM

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1026000

IMPORTANT
See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000 and Data Sheets 10043, and 10003.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

Data from JDC 10003 must be made available before proceeding with this JDC.

NOTE: The G & N Mounting Fixture shall be set at 0.0° position.

1. Insure that the SLAVE TELESCOPE switch on the G & N indicator control panel is set to STAR LOS and that the TRACK pushbutton lamp is not lighted and the TRACKER POWER switch is OFF.

2. Set the CONTROLLER MODE switch on the G & N indicator control panel to DIRECT and the CONTROLLER SPEED switch to HI.

3. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS and after one minute, record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.

4. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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with dot and horizontal reticle line of target #1.

5. Set OPTICS MODE switch to MANUAL. Pushinb the control stick to the right, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Set the CONTROLLER SPEED switch on the G & N indicator control panel to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU reads 270.000° and the 2X TRUNNION CDU reads the value recorded in step 3 line (a).

6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.

7. Cover SXT LLOS and repeat step 6 for the SXT StLOS while maintaining a 2X TRUNNION CDU reading of step 3 line (a) and SHAFT ANGLE CDU reading of 270.000° by manipulating control stick. Record VDW reading in line (e) of Data Sheet. Complete lines (d), (f) and (g) of Data Sheet.

8. Manipulate the control stick to position the SXT until the SHAFT ANGLE CDU indicates approximately 180.0° and the 2X TRUNNION CDU indicates approximately 000.0°.

9. Sight through SCT eyepiece and manipulate the control stick until central dot on reticle of atrget #2 is aligned to horizontal crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS. Wait one minute before proceeding.

12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeroes). Set OPTICS MODE switch to MANUAL.

13. Complete lines (p) (q) and (r) of Data Sheet. Set the CONTROLLER SPEED switch to HI.

14. Repeat step 5.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000°. Return the CONTROLLER SPEED switch to LO.

19. Manipulate the control stick vertically to position the SXT StLOS until central dot

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on reticle of target #3 approaches the vertical crosshair on the SXT reticle. At the instant of coincidence, simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel.

NOTE: VERB 06, NOUN 56 shall appear on G & N AGC DSKY indicating optical CDU and time displays.

20. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (s) of Data Sheet. Release thumbwheel. Repeat step 19 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

21. Observe the three bit counts of line (s) of Data Sheet. If two of the three counts are equal, record this count in line (t). If all three counts are different, record the count which falls between the smallest and the largest on line (t).

22. Record the TRUNNION CDU value from line (s) which corresponds to line (t) in line (u).

23. Complete lines (x) and (y) of Data Sheet.

24. Set VDW to value recorded in line (y) of Data Sheet.

25. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 approaches the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

26. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (z) of Data Sheet. Release thumbwheel. Repeat step 25 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

27. Observe the three bit counts of line (z) of Data Sheet. If two of the three counts are equal, record this count in line (aa). If all three counts are different, record the count which falls between the smallest and the largest in line (aa).

28. Record the TRUNNION CDU value from line (z) which corresponds to line (aa) in line (ab).

29. Complete lines (ae), (af), (ag), (ah), (ak), and (al) of Data Sheet.

30. Set VDW to value recorded in line (al) of Data Sheet.

31. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the verticle crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

32. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (am) of Data Sheet. Release thumbwheel. Repeat

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step 31 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

33. Observe the three bit counts of line (am) of Data Sheet. If two of the three counts are equal, record this count in line (an). If all three counts are different, record the count which falls between the smallest and the largest in line (an).

34. Record TRUNNION CDU value from line (am) which corresponds to line (an) in line (ao).

35. Complete lines (ar), (as), (at), (au), (av) and (aw) of Data Sheet.

36. Set VDW to value recorded in line (aw) of Data Sheet.

37. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

38. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (ax) of Data Sheet. Release thumbwheel. Repeat step 37 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

39. Observe the three bit counts of line (ax) of Data Sheet. If two of the three counts are equal, record this count in line (ay). If all three counts are different, record the count which falls between the smallest and the largest in line (ay).

40. Record the TRUNNION CDU value from line (ax) which corresponds to line (ay) in line (az).

41. Complete lines (bc), (bd), (be), (bf), (bg), and (bh) of Data Sheet.

42. Set VDW to value recorded in line (bh) of Data Sheet.

43. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

44. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bk) of Data Sheet. Release thumbwheel. Repeat step 43 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

45. Observe the three bit counts of line (bk) of Data Sheet. If two of the three counts are equal, record this count in line (bl). If all three counts are different, record the count which falls between the smallest and the largest in line (bl).

46. Record the TRUNNION CDU value from line (bk) which corresponds to line (bl) in line (bm).

47. Complete lines (bp), (bq), (br), (bs), (bt), and (bu) of Data Sheet.

48. Set VDW to value recorded in line (bu) of Data Sheet.

JDC 10043 REV. B PAGE 1 OF 8

JOB OPTICS POSITIONAL ACCURACY TEST

INITIAL TDRR 21539 D.S. PGS 13

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and SXT slew characteristics in the COMPUTER mode are checked in this test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-28-65	22832	ALL	ALL	WK	WM
B	12-14-65	24682	2	13	WK	TM

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1026000

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000 and Data Sheets 10043, and 10003.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC. Data from JDC 10003 must be made available before proceeding with this JDC.

NOTE: The G & N Mounting Fixture shall be set at 0.0° position.

1. Insure that the SLAVE TELESCOPE switch on the G & N indicator control panel is set to STAR LOS and that the TRACK pushbutton lamp is not lighted and the TRACKER POWER switch is OFF.

2. Set the CONTROLLER MODE switch on the G & N indicator control panel to DIRECT and the CONTROLLER SPEED switch to HI.

3. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS and after one minute, record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.

4. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident

with dot and horizontal reticle line of target #1.

5. Set OPTICS MODE switch to MANUAL. Pushinb the control stick to the right, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Set the CONTROLLER SPEED switch on the G & N indicator control panel to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU reads 270.000° and the 2X TRUNNION CDU reads the value recorded in step 3 line (a).

6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.

7. Cover SXT LLOS and repeat step 6 for the SXT StLOS while maintaining a 2X TRUNNION CDU reading of step 3 line (a) and SHAFT ANGLE CDU reading of 270.000° by manipulating control stick. Record VDW reading in line (e) of Data Sheet. Complete lines (d), (f) and (g) of Data Sheet.

8. Manipulate the control stick to position the SXT until the SHAFT ANGLE CDU indicates approximately 180.0° and the 2X TRUNNION CDU indicates approximately 000.0°.

9. Sight through SCT eyepiece and manipulate the control stick until central dot on reticle of atrget #2 is aligned to horizontal crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS. Wait one minute before proceeding.

12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeroes). Set OPTICS MODE switch to MANUAL.

13. Complete lines (p) (q) and (r) of Data Sheet. Set the CONTROLLER SPEED switch to HI.

14. Repeat step 5.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000°. Return the CONTROLLER SPEED switch to LO.

19. Manipulate the control stick vertically to position the SXT StLOS until central dot

on reticle of target #3 approaches the vertical crosshair on the SXT reticle. At the instant of coincidence, simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel.

NOTE: VERB 06, NOUN 56 shall appear on G & N AGC DSKY indicating optical CDU and time displays.

20. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (s) of Data Sheet. Release thumbwheel. Repeat step 19 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

21. Observe the three bit counts of line (s) of Data Sheet. If two of the three counts are equal, record this count in line (t). If all three counts are different, record the count which falls between the smallest and the largest on line (t).

22. Record the TRUNNION CDU value from line (s) which corresponds to line (t) in line (u).

23. Complete lines (x) and (y) of Data Sheet.

24. Set VDW to value recorded in line (y) of Data Sheet.

25. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 approaches the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

26. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (z) of Data Sheet. Release thumbwheel. Repeat step 25 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

27. Observe the three bit counts of line (z) of Data Sheet. If two of the three counts are equal, record this count in line (aa). If all three counts are different, record the count which falls between the smallest and the largest in line (aa).

28. Record the TRUNNION CDU value from line (z) which corresponds to line (aa) in line (ab).

29. Complete lines (ae), (af), (ag), (ah), (ak), and (al) of Data Sheet.

30. Set VDW to value recorded in line (al) of Data Sheet.

31. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the verticle crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

32. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (am) of Data Sheet. Release thumbwheel. Repeat

step 31 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

33. Observe the three bit counts of line (am) of Data Sheet. If two of the three counts are equal, record this count in line (an). If all three counts are different, record the count which falls between the smallest and the largest in line (an).

34. Record TRUNNION CDU value from line (am) which corresponds to line (an) in line (ao).

35. Complete lines (ar), (as), (at), (au), (av) and (aw) of Data Sheet.

36. Set VDW to value recorded in line (aw) of Data Sheet.

37. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

38. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (ax) of Data Sheet. Release thumbwheel. Repeat step 37 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

39. Observe the three bit counts of line (ax) of Data Sheet. If two of the three counts are equal, record this count in line (ay). If all three counts are different, record the count which falls between the smallest and the largest in line (ay).

40. Record the TRUNNION CDU value from line (ax) which corresponds to line (ay) in line (az).

41. Complete lines (bc), (bd), (be), (bf), (bg), and (bh) of Data Sheet.

42. Set VDW to value recorded in line (bh) of Data Sheet.

43. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

44. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bk) of Data Sheet. Release thumbwheel. Repeat step 43 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

45. Observe the three bit counts of line (bk) of Data Sheet. If two of the three counts are equal, record this count in line (bl). If all three counts are different, record the count which falls between the smallest and the largest in line (bl).

46. Record the TRUNNION CDU value from line (bk) which corresponds to line (bl) in line (bm).

47. Complete lines (bp), (bq), (br), (bs), (bt), and (bu) of Data Sheet.

48. Set VDW to value recorded in line (bu) of Data Sheet.

49. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

50. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bv) of Data Sheet. Repeat step 49 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

51. Observe the three bit counts of line (bv) of Data Sheet. If two of the three counts are equal, record this count in line (bw). If all three counts are different, record the count which falls between the smallest and the largest in line (bw).

52. Record the TRUNNION CDU value from line (bv) which corresponds to line (bw) in line (bx).

53. Complete lines (ca), (cb), (cc), (cd), (ce) and (cf) of Data Sheet.

54. Set VDW to value recorded in line (cf) of Data Sheet.

55. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

56. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (cg) of Data Sheet. Repeat step 55 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

57. Observe the three bit counts of line (cg) of Data Sheet. If two of the three counts are equal, record this count in line (ch). If all three counts are different, record the count which falls between the smallest and the largest in line (ch).

58. Record the TRUNNION CDU value from line (cg) which corresponds to line (ch) in line (ck).

59. Complete lines (cn), (co), (cp), and (cq) of Data Sheet.

60. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes OUT, return switch to MANUAL.

61. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Return the CONTROLLER SPEED switch to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU indicates 270.000°.

62. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N Mounting Fixture cradle.

63. Sight through the SXT StLOS and, using the control stick, position the approximate center of the SXT StLOS reticle

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pattern to the number 10 resolution pattern of target #1.

64. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

65. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

66. Sight through the SCT LOS and, using the control stick, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

67. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

68. Set OPTICS MODE switch on G & N indicator panel to ZERO OPTICS. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFF-SET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT vertical reticle line.

69. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

70. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.

71. Set OPTICS MODE switch on G & N indicator control panel to MANUAL.

72. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000° and the SHAFT ANGLE CDU reads 270.000°. (Do not drive through 180.000°.) Return the CONTROLLER SPEED switch to LO and while sighting through the SXT eyepiece, use the control stick to drive the StLOS until the center of the SXT reticle pattern approaches the reticle dot of target #3. At the instant of coincidence press MARK pushbutton.

73. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cu) of Data Sheet.

74. Monitor TRUNNION CDU unconditioned square wave -Δθ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

75. Set following controls on PRIMARY SIGNAL SELECTOR panel:
    COUNTER INPUT "D" PULSE to 13
    D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
    DIGITAL RECORDER SELECTOR to CTR.

77. Set the following controls on COUNTER:
    SAMPLE TIME (N_1) to 002548
    CLOCK FREQUENCY DIVIDER to 10
    DISPLAY RESET to ZERO
    CLOCK SELECTOR to INT
    FUNCTION to Ratio or Period
    INPUT SELECTOR to C SENSE

    SENSE SELECTOR to FWD
    ATTEN D to 10 AC
    SLOPE to +
    TRIGGER VOLTAGE - As required.

77. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter VERB 21, NOUN 01, press ENTER pushbutton. Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

78. Set the OPTICS MODE switch on G & N indicator control panel to COMPUTER.

79. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

80. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

81. Monitor SHAFT CDU unconditioned square wave -Δθ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N_1) on COUNTER to 002913.

82. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

83. Enter R1 from step 73 into G & N AGC DSKY. Press ENTER pushbutton. Enter R2 from step 73 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

84. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

85. Sight through SXT eyepiece. The center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cx) of Data Sheet.

86. Perform calculations (cy) and (cz) on Data Sheet.

87. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in-phase signals on the PAVM:

a. SXT shaft MDA input at 45A8J1 pins 9 (high) and 23 (low)

b. SXT trunnion MDA input at 45A8J1 pins 2 (high) and 1 (low)

Record indications in lines (da) and (db) of Data Sheet.

88. Adjust G & N MOUNTING FIXTURE to approximately +25°.

89. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes out, return switch to COMPUTER.

90. Enter VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

91. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

92. Enter +18000 into row 1 of G & N AGC DSKY. Press ENTER pushbutton. Enter +25000 into row 2 of G & N AGC DSKY. Press ENTER pushbutton.

93. Record the Telescope Panel Angle Counter shaft and trunnion indications on the data sheet.

94. Sight through SXT eyepiece and insure that horizontal reticle line of SXTis coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle.

95. Set the OPTICS MODE switch on G & N indicator control panel to MANUAL. Set the CONTROLLER SPEED switch to LO.

96. Sight through the SCT 1X eyepiece and manipulate the control stick vertically to position the SCT LOS until central horizontal reticle line of SCT approaches the central dot on the reticle of target #2. At the instant of coincidence press MARK pushbutton. Record indication of R2 of G & N AGC DSKY.

49. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

50. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bv) of Data Sheet. Repeat step 49 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

51. Observe the three bit counts of line (bv) of Data Sheet. If two of the three counts are equal, record this count in line (bw). If all three counts are different, record the count which falls between the smallest and the largest in line (bw).

52. Record the TRUNNION CDU value from line (bv) which corresponds to line (bw) in line (bx).

53. Complete lines (ca), (cb), (cc), (cd), (ce) and (cf) of Data Sheet.

54. Set VDW to value recorded in line (cf) of Data Sheet.

55. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

56. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (cg) of Data Sheet. Repeat step 55 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

57. Observe the three bit counts of line (cg) of Data Sheet. If two of the three counts are equal, record this count in line (ch). If all three counts are different, record the count which falls between the smallest and the largest in line (ch).

58. Record the TRUNNION CDU value from line (cg) which corresponds to line (ch) in line (ck).

59. Complete lines (cn), (co), (cp), and (cq) of Data Sheet.

60. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes OUT, return switch to MANUAL.

61. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Return the CONTROLLER SPEED switch to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU indicates 270.000°.

62. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N Mounting Fixture cradle.

63. Sight through the SXT StLOS and, using the control stick, position the approximate center of the SXT StLOS reticle

pattern to the number 10 resolution pattern of target #1.

64. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

65. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

66. Sight through the SCT LOS and, using the control stick, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

67. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

68. Set OPTICS MODE switch on G & N indicator panel to ZERO OPTICS. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFF-SET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT vertical reticle line.

69. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

70. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.

71. Set OPTICS MODE switch on G & N indicator control panel to MANUAL.

72. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000° and the SHAFT ANGLE CDU reads 270.000°. (Do not drive through 180.000°.) Return the CONTROLLER SPEED switch to LO and while sighting through the SXT eyepiece, use the control stick to drive the StLOS until the center of the SXT reticle pattern approaches the reticle dot of target #3. At the instant of coincidence press MARK pushbutton.

73. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cu) of Data Sheet.

74. Monitor TRUNNION CDU unconditioned square wave -Δθ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

75. Set following controls on PRIMARY SIGNAL SELECTOR panel:

COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
DIGITAL RECORDER SELECTOR to CTR.

77. Set the following controls on COUNTER:

SAMPLE TIME (N_1) to 002548
CLOCK FREQUENCY DIVIDER to 10
DISPLAY RESET to ZERO
CLOCK SELECTOR to INT
FUNCTION to Ratio or Period
INPUT SELECTOR to C SENSE

SENSE SELECTOR to FWD
ATTEN D to 10 AC
SLOPE to +
TRIGGER VOLTAGE - As required.

77. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter VERB 21, NOUN 01, press ENTER pushbutton. Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

78. Set the OPTICS MODE switch on G & N indicator control panel to COMPUTER.

79. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

80. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

81. Monitor SHAFT CDU unconditioned square wave -Δθ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N_1) on COUNTER to 002913.

82. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

83. Enter R1 from step 73 into G & N AGC DSKY. Press ENTER pushbutton. Enter R2 from step 73 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

84. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

85. Sight through SXT eyepiece. The center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cx) of Data Sheet.

86. Perform calculations (cy) and (cz) on Data Sheet.

87. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in-phase signals on the PAVM:

a. SXT shaft MDA input at 45A8J1 pins 9 (high) and 23 (low)

b. SXT trunnion MDA input at 45A8J1 pins 2 (high) and 1 (low)

Record indications in lines (da) and (db) of Data Sheet.

88. Adjust G & N MOUNTING FIXTURE to approximately +25°.

89. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes out, return switch to COMPUTER.

90. Enter VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

91. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

92. Enter +18000 into row 1 of G & N AGC DSKY. Press ENTER pushbutton. Enter +25000 into row 2 of G & N AGC DSKY. Press ENTER pushbutton.

93. Record the Telescope Panel Angle Counter shaft and trunnion indications on the data sheet.

94. Sight through SXT eyepiece and insure that horizontal reticle line of SXT is coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle.

95. Set the OPTICS MODE switch on G & N indicator control panel to MANUAL. Set the CONTROLLER SPEED switch to LO.

96. Sight through the SCT 1X eyepiece and manipulate the control stick vertically to position the SCT LOS until central horizontal reticle line of SCT approaches the central dot on the reticle of target #2. At the instant of coincidence press MARK pushbutton. Record indication of R2 of G & N AGC DSKY.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 13

JDC
NO. 10043
REV. B
INITIAL TDRR 21539

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
3	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ______	+0.006			(a)
3	Record SHAFT CDU indication	deg	-0.006	( ) ______	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min	▨	______ ______	▨	▨	▨	(c)
7	Convert Line (c) to sec. using Calibration Chart	Sec	▨	( ) ______	▨	▨	▨	(d)
6	Record VDW Reading of WSTLOS	Deg Min	▨	______ ______	▨	▨	▨	(e)
7	Convert Line (e) to sec. using calibration chart	sec	▨	( ) ______	▨	▨	▨	(f)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
7	Calculate: Line (f) - Line (d) StLOS-LLOS parallelism	sec	-10	( ) ______	10			(g)
9	Record 2X TRUNNION CDU indication	deg	▨	( ) ______	▨	▨	▨	(h)
9	Record TRUNNION ANGLE indication TRN	deg	▨	( ) ______	▨	▨	▨	(k)
10	Calculate: Line (h) - Line (a) SCT-SXT parallelism	deg	-0.4	( ) ______	+0.4			(m)
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec	▨	______ ______ ______	▨	▨	▨	(n)
13	Calculate: 45° - line (n) to nearest second	Sec	▨	( ) ______	▨	▨	▨	(p)
13	Calculate: Line (p) + Line (d)	Sec	▨	( ) ______	▨	▨	▨	(q)

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
13	Convert Line (q) to VDW reading using calibration chart **	Deg Min	▨	______ ______	▨	▨	▨	(r)
20	Record AGC display * and TRUNNION CDU 45°	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	(s)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	
21	Select bit count 45°	bits	16382	______	16386			(t)
21	CDU TRN 45°	deg	▨	__ __ . __ __ __	▨	▨	▨	(u)
23	Calculate: Line (q) + 90 sec	sec	▨	( ) ______	▨	▨	▨	(x)
23	Convert Line (x) to VDW reading using calibration chart	deg min	▨	______ ______	▨	▨	▨	(y)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.
** If line (q) is -, add calibration chart indication to 0°0'.
If line (q) is +, subtract calibration chart indication from 350°60'.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
26	Record AGC display * and TRUNNION CDU 45° (+ 90")	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	(z)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	
27	Select bit count 45° (+ 90")	bits	▨	______	▨	▨	▨	(aa)
27	CDU TRN 45° (+ 90")	deg	▨	__ __ . __ __ __	▨	▨	▨	(ab)
29	Calculate: Line (t) + 00009 bits	bits	▨	( ) ______	▨	▨	▨	(ae)
29	Calculate: Line (aa) - Line (ae) G & N Accuracy BITS 45° (+ 90")	bits	-2	( ) ______	+2			(af)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 13

JDC
NO. 10043
REV. B
INITIAL TDRR 21539

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION ______
TIME ______ START ______ END ______ TOTAL ELAPSED ______

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE ______
NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
3	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ______	+0.006			(a)
3	Record SHAFT CDU indication	deg	-0.006	( ) ______	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min		______ ______				(c)
7	Convert Line (c) to sec. using Calibration Chart	Sec		( ) ______				(d)
6	Record VDW Reading of WSTLOS	Deg Min		______ ______				(e)
7	Convert Line (e) to sec. using calibration chart	sec		( ) ______				(f)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
7	Calculate: Line (f) - Line (d) StLOS-LLOS parallelism	sec	-10	( ) ______	10			(g)
9	Record 2X TRUNNION CDU indication	deg		( ) ______				(h)
9	Record TRUNNION ANGLE indication TRN	deg		( ) ______				(k)
10	Calculate: Line (h) - Line (a) SCT-SXT parallelism	deg	-0.4	( ) ______	+0.4			(m)
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec		______ ______ ______				(n)
13	Calculate: 45° - line (n) to nearest second	Sec		( ) ______				(p)
13	Calculate: Line (p) + Line (d)	Sec		( ) ______				(q)

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
13	Convert Line (q) to VDW reading using calibration chart **	Deg Min		______ ______				(r)
20	Record AGC display * and TRUNNION CDU 45°	CDU TRN ° R2 deg bits		— — . — — — — — . — — — ______				(s)
		CDU TRN ° R2 deg bits		— — . — — — — — . — — — ______				
		CDU TRN ° R2 deg bits		— — . — — — — — . — — — ______				
21	Select bit count 45°	bits	16382	______	16386			(t)
21	CDU TRN 45°	deg		— — . — — —				(u)
23	Calculate: Line (q) + 90 sec	sec		( ) ______				(x)
23	Convert Line (x) to VDW reading using calibration chart	deg min		______ ______				(y)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.
** If line (q) is -, add calibration chart indication to 0°0'.
If line (q) is +, subtract calibration chart indication from 350°60'.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
26	Record AGC display * and TRUNNION CDU 45° (+ 90")	CDU TRN ° R2 deg bits		— — . — — — — — . — — — ______				(z)
		CDU TRN ° R2 deg bits		— — . — — — — — . — — — ______				
		CDU TRN ° R2 deg bits		— — . — — — — — . — — — ______				
27	Select bit count 45° (+ 90")	bits		______				(aa)
27	CDU TRN 45° (+ 90")	deg		— — . — — —				(ab)
29	Calculate: Line (t) + 00009 bits	bits		( ) ______				(ae)
29	Calculate: Line (aa) - Line (ae) G & N Accuracy BITS 45° (+ 90")	bits	-2	( ) ______	+2			(af)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Calculate: Line (u) +00.050 deg	deg		( ) ______				(ag)
29	Calculate: Line (ab) - Line (ag) G & N Accuracy CDU 45° (+90")	deg		( ) ______				(ah)
29	Calculate: Line (q) + 30 sec	sec		( ) ______				(ak)
29	Convert Line (ak) to VDW reading using calibration chart	deg min		______ ______				(al)
32	Record AGC display * and TRUNNION CDU 45° (+30")	CDU TRN ° R2 deg bits		__ __ · __ __ __ __ __ · __ __ __ ______				(am)
		CDU TRN ° R2 deg bits		__ __ · __ __ __ __ __ · __ __ __ ______				
		CDU TRN ° R2 deg bits		__ __ · __ __ __ __ __ · __ __ __ ______				
33	Select bit count 45° (+30")	bits		______				(an)
33	CDU TRN 45° (+30")	deg		__ __ · __ __ __				(ao)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
35	Calculate: Line (t) +00003 bits	bits		( ) ______				(ar)
35	Calculate: Line (an) - Line (ar) G & N Accuracy BITS 45° (+30")	bits	-2	( ) ______	+2			(as)
35	Calculate: Line (u) +00.017 deg	deg		( ) ______				(at)
35	Calculate: Line (ao) - Line (at) G & N Accuracy CDU 45° (+30")	deg		( ) ______				(au)
35	Calculate: Line (q) +60 sec	sec		( ) ______				(av)
35	Convert Line (av) to VDW reading using calibration chart	deg min		______ ______				(aw)

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Record AGC display * and TRUNNION CDU 45° (+60")	CDU TRN ° R2 deg bits		__ __ · __ __ __ __ __ · __ __ __ ______				(ax)
		CDU TRN ° R2 deg bits		__ __ · __ __ __ __ __ · __ __ __ ______				
		CDU TRN ° R2 deg bits		__ __ · __ __ __ __ __ · __ __ __ ______				
39	Select bit count 45° (+60")	bits		______				(ay)
39	CDU TRN 45° (+60")	deg		__ __ · __ __ __				(az)
41	Calculate: Line (t) +00006 bits	bits		( ) ______				(bc)
41	Calculate: Line (ay) - Line (bc) G & N Accuracy BITS 45° (+60")	bits	-2	( ) ______	+2			(bd)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
41	Calculate: Line (u) +00.033 deg	deg		( ) ______				(be)
41	Calculate: Line (az) - Line (be) G & N Accuracy CDU 45° (+60")	deg		( ) ______				(bf)
41	Calculate: Line (q) - 30 sec	sec		( ) ______				(bg)
41	Convert Line (bg) to VDW reading using calibration chart	deg min		______ ______				(bh)
44	Record AGC display * and TRUNNION CDU 45° (-30")	CDU TRN ° R2 deg bits		__ __ · __ __ __ __ __ · __ __ __ ______				(bk)
		CDU TRN ° R2 deg bits		__ __ · __ __ __ __ __ · __ __ __ ______				
		CDU TRN ° R2 deg bits		__ __ · __ __ __ __ __ · __ __ __ ______				
45	Select bit count 45° (-30")	bits		______				(bl)
45	CDU TRN 45° (-30")	deg		__ __ · __ __ __				(bm)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Calculate: Line (u) +00.050 deg	deg		( ) ______				(ag)
29	Calculate: Line (ab) - Line (ag) G & N Accuracy CDU 45° (+ 90")	deg		( ) ______				(ah)
29	Calculate: Line (q) + 30 sec	sec		( ) ______				(ak)
29	Convert Line (ak) to VDW reading using calibration chart	deg min		______ ______				(al)
32	Record AGC display * and TRUNNION CDU 45° (+ 30")	CDU TRN ° R2 deg bits		— — . — — — — — . — — —				(am)
		CDU TRN ° R2 deg bits		— — . — — — — — . — — —				
		CDU TRN ° R2 deg bits		— — . — — — — — . — — —				
33	Select bit count 45° (+ 30")	bits		______				(an)
33	CDU TRN 45° (+ 30")	deg		— — . — — —				(ao)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
35	Calculate: Line (t) +00003 bits	bits		( ) ______				(ar)
35	Calculate: Line (an) - Line (ar) G & N Accuracy BITS 45° (+ 30")	bits	-2	( ) ______	+2			(as)
35	Calculate: Line (u) +00.017 deg	deg		( ) ______				(at)
35	Calculate: Line (ao) - Line (at) G & N Accuracy CDU 45° (+ 30")	deg		( ) ______				(au)
35	Calculate: Line (q) +60 sec	sec		( ) ______				(av)
35	Convert Line (av) to VDW reading using calibration chart	deg min		______ ______				(aw)

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 13

JDC
NO. 1004
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Record AGC display * and TRUNNION CDU 45° (+ 60")	CDU TRN ° R2 deg bits		— — . — — — — — . — — —				(ax)
		CDU TRN ° R2 deg bits		— — . — — — — — . — — —				
		CDU TRN ° R2 deg bits		— — . — — — — — . — — —				
39	Select bit count 45° (+ 60")	bits		______				(ay)
39	CDU TRN 45° (+ 60")	deg		— — . — — —				(az)
41	Calculate: Line (t) +00006 bits	bits		( ) ______				(bc)
41	Calculate: Line (ay) - Line (bc) G & N Accuracy BITS 45° (+ 60")	bits	-2	( ) ______	+2			(bd)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
41	Calculate: Line (u) +00.033 deg	deg		( ) ______				(be)
41	Calculate: Line (az) - Line (be) G & N Accuracy CDU 45° (+60")	deg		( ) ______				(bf)
41	Calculate: Line (q) - 30 sec	sec		( ) ______				(bg)
41	Convert Line (bg) to VDW reading using calibration chart	deg min		______ ______				(bh)
44	Record AGC display * and TRUNNION CDU 45° (-30")	CDU TRN ° R2 deg bits		— — . — — — — — . — — —				(bk)
		CDU TRN ° R2 deg bits		— — . — — — — — . — — —				
		CDU TRN ° R2 deg bits		— — . — — — — — . — — —				
45	Select bit count 45° (-30")	bits		______				(bl)
45	CDU TRN 45° (-30")	deg		— — . — — —				(bm)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
47	Calculate: Line (t) -00003 bits	bits	▨	( )	▨	▨	▨	(bp)
47	Calculate: Line (bl) - Line (bp) G & N Accuracy BITS 45° (-30")	bits	-2	( )	+2			(bq)
47	Calculate: Line (u) -00.017 deg	deg	▨	( )	▨	▨	▨	(br)
47	Calculate: Line (bm) -Line (br) G & N Accuracy CDU 45° (-30")	deg	▨	( )	▨	▨	▨	(bs)
47	Calculate: Line (q) -90 sec	sec	▨	( )	▨	▨	▨	(bt)
47	Convert Line (bt) to VDW reading using calibration chart	deg min	▨		▨	▨	▨	(bu)
			▨		▨	▨	▨	

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
50	Record AGC display * and TRUNNION CDU 45° (-90")	CDU TRN ° R2 deg bits CDU TRN ° R2 deg bits CDU TRN ° R2 deg bits	▨		▨	▨	▨	(bv)
51	Select bit count 45° (-90")	bits	▨		▨	▨	▨	(bw)
51	CDU TRN 45° (-90")	deg	▨		▨	▨	▨	(bx)
53	Calculate: Line (t) -00009 bits	bits	▨	( )	▨	▨	▨	(ca)
53	Calculate: Line (bw) - Line (ca) G & N Accuracy BITS 45° (-90")	bits	-2	( )	+2			(cb)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
53	Calculate: Line (u) -00.050 deg	deg	▨	( )	▨	▨	▨	(cc)
53	Calculate: Line (bx) - Line (cc) G & N Accuracy CDU 45° (-90")	deg	▨	( )	▨	▨	▨	(cd)
53	Calculate: Line (q) -60 sec	sec	▨	( )	▨	▨	▨	(ce)
53	Convert Line (ce) to VDW reading using calibration chart	deg min	▨		▨	▨	▨	(cf)
56	Record AGC display * and TRUNNION CDU 45° (-60")	CDU TRN ° R2 deg bits CDU TRN ° R2 deg bits CDU TRN ° R2 deg bits	▨		▨	▨	▨	(cg)
57	Select bit count 45° (-60")	bits	▨		▨	▨	▨	(ch)
57	CDU TRN 45° (-60")	deg	▨		▨	▨	▨	(ck)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 OF 13

JDC
NO. 00043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	Calculate: Line (t) -00006 bits	bits	▨	( )	▨	▨	▨	(cn)
59	Calculate: Line (cn) - Line (cn) G & N Accuracy BITS 45° (-60")	bits	-2	( )	+2			(co)
59	Calculate: Line (u) -00.033 deg	deg	▨	( )	▨	▨	▨	(cp)
59	Calculate: Line (ck) - Line (cp) G & N Accuracy CDU 45° (-60")	deg	▨	( )	▨	▨	▨	(cq)
68	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cr)
69	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cs)
64 67	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(ct)
73	AGC DSKY indication	R_1 deg R_2 deg	▨		▨	▨	▨	(cu)
80	TRUN DAC slew	sec	0		14.0			(cv)
83	Shaft DAC slew	sec	0		8.0			(cw)
85	AGC DSKY indication	R_1 deg R_2 deg	▨		▨	▨	▨	(cx)

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
47	Calculate: Line (t) -00003 bits	bits	▨	( ) ______	▨	▨	▨	(bp)
47	Calculate: Line (bl) - Line (bp) G & N Accuracy BITS 45° (-30")	bits	-2	( ) ______	+2			(bq)
47	Calculate: Line (u) -00.017 deg	deg	▨	( ) ______	▨	▨	▨	(br)
47	Calculate: Line (bm) -Line (br) G & N Accuracy CDU 45° (-30")	deg	▨	( ) ______	▨	▨	▨	(bs)
47	Calculate: Line (q) -90 sec	sec	▨	( ) ______	▨	▨	▨	(bt)
47	Convert Line (bt) to VDW reading using calibration chart	deg min	▨	______ ______	▨	▨	▨	(bu)
			▨		▨	▨	▨	

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
50	Record AGC display * and TRUNNION CDU 45° (-90")	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ . __ __ ______	▨	▨	▨	(bv)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ . __ __ ______	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ . __ __ ______	▨	▨	▨	
51	Select bit count 45° (-90")	bits	▨	______	▨	▨	▨	(bw)
51	CDU TRN 45° (-90")	deg	▨	__ __ . __ __	▨	▨	▨	(bx)
53	Calculate: Line (t) -00009 bits	bits	▨	( ) ______	▨	▨	▨	(ca)
53	Calculate: Line (bw) - Line (ca) G & N Accuracy BITS 45° (-90")	bits	-2	( ) ______	+2			(cb)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
53	Calculate: Line (u) -00.050 deg	deg	▨	( ) ______	▨	▨	▨	(cc)
53	Calculate: Line (bx) - Line (cc) G & N Accuracy CDU 45° (-90")	deg	▨	( ) ______	▨	▨	▨	(cd)
53	Calculate: Line (q) -60 sec	sec	▨	( ) ______	▨	▨	▨	(ce)
53	Convert Line (ce) to VDW reading using calibration chart	deg min	▨	______ ______	▨	▨	▨	(cf)
56	Record AGC display * and TRUNNION CDU 45° (-60")	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ . __ __ ______	▨	▨	▨	(cg)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ . __ __ ______	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ . __ __ ______	▨	▨	▨	
57	Select bit count 45° (-60")	bits	▨	______	▨	▨	▨	(ch)
57	CDU TRN 45° (-60")	deg	▨	__ __ . __ __	▨	▨	▨	(ck)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 OF 13

JDC
NO. 00043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	Calculate: Line (t) -00006 bits	bits	▨	( ) ______	▨	▨	▨	(cn)
59	Calculate: Line (ch) - Line (cn) G & N Accuracy BITS 45° (-60")	bits	-2	( ) ______	+2			(co)
59	Calculate: Line (u) -00.033 deg	deg	▨	( ) ______	▨	▨	▨	(cp)
59	Calculate: Line (ck) - Line (cp) G & N Accuracy CDU 45° (-60")	deg	▨	( ) ______	▨	▨	▨	(cq)
68	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cr)
69	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cs)
64 67	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(ct)
73	AGC DSKY indication	R_1 deg R_2 deg	▨	______ ______	▨	▨	▨	(cu)
80	TRUN DAC slew	sec	0	______	14.0			(cv)
83	Shaft DAC slew	sec	0	______	8.0			(cw)
85	AGC DSKY indication	R_1 deg R_2 deg	▨	______ ______	▨	▨	▨	(cx)

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 OF 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
86	Calculate: Line (cx) R_1 - Line (cu) R_1 (SHAFT)	deg	-.022	( )________	+.022			(cy)
86	Calculate: Line (cx) R_2 - Line (cu) R_2 (TRUNNION)	deg	-0.01	( )________	+.01			(cz)
87	SXT shaft MDA input	mv	0	________	100			(da)
87	SXT trunnion MDA input	mv	0	________	100			(db)
93	SCT TRUNNION Counter	deg	24.85	( )________	25.15			(dc)
93	SCT SHAFT Counter	deg	179.92	( )________	180.08			(dd)
94	(SCT) TRUNNION R2 DSKY indication	deg	24.8	________	25.2			(de)

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 **OF** 13

JDC
NO. 10043
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
86	Calculate: Line (cx) R_1 - Line (cu) R_1 (SHAFT)	deg	-.022	( ) ______	+.022			(cy)
86	Calculate: Line (cx) R_2 - Line (cu) R_2 (TRUNNION)	deg	-0.01	( ) ______	+.01			(cz)
87	SXT shaft MDA input	mv	0	______	100			(da)
87	SXT trunnion MDA input	mv	0	______	100			(db)
93	SCT TRUNNION Counter	deg	24.85	( ) ______	25.15			(dc)
93	SCT SHAFT Counter	deg	179.92	( ) ______	180.08			(dd)
94	(SCT) TRUNNION R2 DSKY indication	deg	24.8	______	25.2			(de)

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JDC 10043 REV. C PAGE 1 OF 8

JOB OPTICS POSITIONAL ACCURACY TEST

INITIAL TDRR 21539 D.S. PGS 13

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and SXT slew characteristics in the COMPUTER mode are checked in this test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-28-65	22832	ALL	ALL	WK	WM
B	12-14-65	24682	2	13	WK	TM
C	3-8-66	26922	-	3, 13	WK	ACM

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1026000

IMPORTANT

See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000 and Data Sheets 10043, and 10003.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC. Data from JDC 10003 must be made available before proceeding with this JDC. NOTE: The G & N Mounting Fixture shall be set at 0.0° position.

1. Insure that the SLAVE TELESCOPE switch on the G & N indicator control panel is set to STAR LOS and that the TRACK pushbutton lamp is not lighted and the TRACKER POWER switch is OFF.

2. Set the CONTROLLER MODE switch on the G & N indicator control panel to DIRECT and the CONTROLLER SPEED switch to HI.

3. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS and after one minute, record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.

4. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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with dot and horizontal reticle line of target #1.

5. Set OPTICS MODE switch to MANUAL. Pushinb the control stick to the right, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Set the CONTROLLER SPEED switch on the G & N indicator control panel to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU reads 270.000° and the 2X TRUNNION CDU reads the value recorded in step 3 line (a).

6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.

7. Cover SXT LLOS and repeat step 6 for the SXT StLOS while maintaining a 2X TRUNNION CDU reading of step 3 line (a) and SHAFT ANGLE CDU reading of 270.000° by manipulating control stick. Record VDW reading in line (e) of Data Sheet. Complete lines (d), (f) and (g) of Data Sheet.

8. Manipulate the control stick to position the SXT until the SHAFT ANGLE CDU indicates approximately 180.0° and the 2X TRUNNION CDU indicates approximately 000.0°.

9. Sight through SCT eyepiece and manipulate the control stick until central dot on reticle of atrget #2 is aligned to horizontal crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS. Wait one minute before proceeding.

12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeroes). Set OPTICS MODE switch to MANUAL.

13. Complete lines (p) (q) and (r) of Data Sheet. Set the CONTROLLER SPEED switch to HI.

14. Repeat step 5.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000°. Return the CONTROLLER SPEED switch to LO.

19. Manipulate the control stick vertically to position the SXT StLOS until central dot

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on reticle of target #3 approaches the vertical crosshair on the SXT reticle. At the instant of coincidence, simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel.

NOTE: VERB 06, NOUN 56 shall appear on G & N AGC DSKY indicating optical CDU and time displays.

20. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (s) of Data Sheet. Release thumbwheel. Repeat step 19 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

21. Observe the three bit counts of line (s) of Data Sheet. If two of the three counts are equal, record this count in line (t). If all three counts are different, record the count which falls between the smallest and the largest on line (t).

22. Record the TRUNNION CDU value from line (s) which corresponds to line (t) in line (u).

23. Complete lines (x) and (y) of Data Sheet.

24. Set VDW to value recorded in line (y) of Data Sheet.

25. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 approaches the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

26. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (z) of Data Sheet. Release thumbwheel. Repeat step 25 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

27. Observe the three bit counts of line (z) of Data Sheet. If two of the three counts are equal, record this count in line (aa). If all three counts are different, record the count which falls between the smallest and the largest in line (aa).

28. Record the TRUNNION CDU value from line (z) which corresponds to line (aa) in line (ab).

29. Complete lines (ae), (af), (ag), (ah), (ak), and (al) of Data Sheet.

30. Set VDW to value recorded in line (al) of Data Sheet.

31. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the verticle crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

32. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (am) of Data Sheet. Release thumbwheel. Repeat

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step 31 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

33. Observe the three bit counts of line (am) of Data Sheet. If two of the three counts are equal, record this count in line (an). If all three counts are different, record the count which falls between the smallest and the largest in line (an).

34. Record TRUNNION CDU value from line (am) which corresponds to line (an) in line (ao).

35. Complete lines (ar), (as), (at), (au), (av) and (aw) of Data Sheet.

36. Set VDW to value recorded in line (aw) of Data Sheet.

37. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

38. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (ax) of Data Sheet. Release thumbwheel. Repeat step 37 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

39. Observe the three bit counts of line (ax) of Data Sheet. If two of the three counts are equal, record this count in line (ay). If all three counts are different, record the count which falls between the smallest and the largest in line (ay).

40. Record the TRUNNION CDU value from line (ax) which corresponds to line (ay) in line (az).

41. Complete lines (bc), (bd), (be), (bf), (bg), and (bh) of Data Sheet.

42. Set VDW to value recorded in line (bh) of Data Sheet.

43. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

44. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bk) of Data Sheet. Release thumbwheel. Repeat step 43 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

45. Observe the three bit counts of line (bk) of Data Sheet. If two of the three counts are equal, record this count in line (bl). If all three counts are different, record the count which falls between the smallest and the largest in line (bl).

46. Record the TRUNNION CDU value from line (bk) which corresponds to line (bl) in line (bm).

47. Complete lines (bp), (bq), (br), (bs), (bt), and (bu) of Data Sheet.

48. Set VDW to value recorded in line (bu) of Data Sheet.

49. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

50. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bv) of Data Sheet. Repeat step 49 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

51. Observe the three bit counts of line (bv) of Data Sheet. If two of the three counts are equal, record this count in line (bw). If all three counts are different, record the count which falls between the smallest and the largest in line (bw).

52. Record the TRUNNION CDU value from line (bv) which corresponds to line (bw) in line (bx).

53. Complete lines (ca), (cb), (cc), (cd), (ce) and (cf) of Data Sheet.

54. Set VDW to value recorded in line (cf) of Data Sheet.

55. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

56. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (cg) of Data Sheet. Repeat step 55 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

57. Observe the three bit counts of line (cg) of Data Sheet. If two of the three counts are equal, record this count in line (ch). If all three counts are different, record the count which falls between the smallest and the largest in line (ch).

58. Record the TRUNNION CDU value from line (cg) which corresponds to line (ch) in line (ck).

59. Complete lines (cn), (co), (cp), and (cq) of Data Sheet.

60. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes OUT, return switch to MANUAL.

61. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Return the CONTROLLER SPEED switch to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU indicates 270.000°.

62. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N Mounting Fixture cradle.

63. Sight through the SXT StLOS and, using the control stick, position the approximate center of the SXT StLOS reticle

pattern to the number 10 resolution pattern of target #1.

64. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

65. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

66. Sight through the SCT LOS and, using the control stick, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

67. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

68. Set OPTICS MODE switch on G & N indicator panel to ZERO OPTICS. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFF-SET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT vertical reticle line.

69. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

70. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.

71. Set OPTICS MODE switch on G & N indicator control panel to MANUAL.

72. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000° and the SHAFT ANGLE CDU reads 270.000°. (Do not drive through 180.000°.) Return the CONTROLLER SPEED switch to LO and while sighting through the SXT eyepiece, use the control stick to drive the StLOS until the center of the SXT reticle pattern approaches the reticle dot of target #3. At the instant of coincidence press MARK pushbutton.

73. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cu) of Data Sheet.

74. Monitor TRUNNION CDU unconditioned square wave -Δθ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

75. Set following controls on PRIMARY SIGNAL SELECTOR panel:
COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
DIGITAL RECORDER SELECTOR to CTR.

77. Set the following controls on COUNTER:
SAMPLE TIME (N_i) to 002548
CLOCK FREQUENCY DIVIDER to 10
DISPLAY RESET to ZERO
CLOCK SELECTOR to INT
FUNCTION to Ratio or Period
INPUT SELECTOR to C SENSE

SENSE SELECTOR to FWD
ATTEN D to 10 AC
SLOPE to +
TRIGGER VOLTAGE - As required.

77. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter VERB 21, NOUN 01, press ENTER pushbutton. Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

78. Set the OPTICS MODE switch on G & N indicator control panel to COMPUTER.

79. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

80. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

81. Monitor SHAFT CDU unconditioned square wave -Δθ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N_i) on COUNTER to 002913.

82. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

83. Enter R1 from step 73 into G & N AGC DSKY. Press ENTER pushbutton. Enter R2 from step 73 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

84. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

85. Sight through SXT eyepiece. The center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cx) of Data Sheet.

86. Perform calculations (cy) and (cz) on Data Sheet.

87. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in-phase signals on the PAVM:

a. SXT shaft MDA input at 45A8J1 pins 9 (high) and 23 (low)

b. SXT trunnion MDA input at 45A8J1 pins 2 (high) and 1 (low)

Record indications in lines (da) and (db) of Data Sheet.

88. Adjust G & N MOUNTING FIXTURE to approximately +25°.

89. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes out, return switch to COMPUTER.

90. Enter VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

91. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

92. Enter +18000 into row 1 of G & N AGC DSKY. Press ENTER pushbutton. Enter +25000 into row 2 of G & N AGC DSKY. Press ENTER pushbutton.

93. Record the Telescope Panel Angle Counter shaft and trunnion indications on the data sheet.

94. Sight through SXT eyepiece and insure that horizontal reticle line of SXT is coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle.

95. Set the OPTICS MODE switch on G & N indicator control panel to MANUAL. Set the CONTROLLER SPEED switch to LO.

96. Sight through the SCT 1X eyepiece and manipulate the control stick vertically to position the SCT LOS until central horizontal reticle line of SCT approaches the central dot on the reticle of target #2. At the instant of coincidence press MARK pushbutton. Record indication of R2 of G & N AGC DSKY.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 13

JDC
NO. 10043
REV. C
INITIAL TDRR 21559

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST

TITLE ____________________

SER NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION

TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________________ SER. NO. ________ CAL DATE ________

NAME ____________________ SER. NO. ________ CAL DATE ________

CONDUCTED BY ____________ NAME/AFFILIATION APPROVED BY ____________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
3	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ________	+0.006			(a)
3	Record SHAFT CDU indication	deg	-0.006	( ) ________	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min		________ ________				(c)
7	Convert Line (c) to sec. using Calibration Chart	Sec		( ) ________				(d)
6	Record VDW Reading of WSTLOS	Deg Min		________ ________				(e)
7	Convert Line (e) to sec. using calibration chart	sec		( ) ________				(f)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 13

JDC
NO. 10043
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
7	Calculate: Line (f) - Line (d) StLOS-LLOS parallelism	sec	-10	( ) ________	10			(g)
9	Record 2X TRUNNION CDU indication	deg		( ) ________				(h)
9	Record TRUNNION ANGLE indication TRN	deg		( ) ________				(k)
10	Calculate: Line (h) - Line (a) SCT-SXT parallelism	deg	-0.4	( ) ________	+0.4			(m)
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec		________ ________ ________				(n)
13	Calculate: 45° - line (n) to nearest second	Sec		( ) ________				(p)
13	Calculate: Line (p) + Line (d)	Sec		( ) ________				(q)

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 13

JDC
NO. 10043
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
13	Convert Line (q) to VDW reading using calibration chart **	Deg Min		________ ________				(r)
20	Record AGC display * and TRUNNION CDU 45°	CDU TRN ° R2 deg bits		— —.— — — — —.— — — ________				(s)
		CDU TRN ° R2 deg bits		— —.— — — — —.— — — ________				
		CDU TRN ° R2 deg bits		— —.— — — — —.— — — ________				
21	Select bit count 45°	bits	16382	________	16386			(t)
21	CDU TRN 45°	deg		— —.— — —				(u)
23	Calculate: Line (q) + 90 sec	sec		( ) ________				(x)
23	Convert Line (x) to VDW reading using calibration chart	deg min		________ ________				(y)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.
** If line (q) is -, add calibration chart indication to 0°0'.
If line (q) is +, subtract calibration chart indication from 359°60'.

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 13

JDC
NO. 10043
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
26	Record AGC display * and TRUNNION CDU 45° (+ 90")	CDU TRN ° R2 deg bits		— —.— — — — —.— — — ________				(z)
		CDU TRN ° R2 deg bits		— —.— — — — —.— — — ________				
		CDU TRN ° R2 deg bits		— —.— — — — —.— — — ________				
27	Select bit count 45° (+ 90")	bits		________				(aa)
27	CDU TRN 45° (+ 90")	deg		— —.— — —				(ab)
29	Calculate: Line (t) +00009 bits	bits		( ) ________				(ae)
29	Calculate: Line (aa) - Line (ae) G & N Accuracy BITS 45° (+ 90")	bits	-2	( ) ________	+2			(af)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 13

JDC
NO. 10043
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Calculate: Line (u) +00.050 deg	deg		( ) ________				(ag)
29	Calculate: Line (ab) - Line (ag) G & N Accuracy CDU 45° (+90")	deg		( ) ________				(ah)
29	Calculate: Line (q) + 30 sec	sec		( ) ________				(ak)
29	Convert Line (ak) to VDW reading using calibration chart	deg min		________ ________				(al)
32	Record AGC display * and TRUNNION CDU 45° (+30")	CDU TRN ° R2 deg bits		__ __ . __ __ __ __ __ . __ __ __ ________				(am)
		CDU TRN ° R2 deg bits		__ __ . __ __ __ __ __ . __ __ __ ________				
		CDU TRN ° R2 deg bits		__ __ . __ __ __ __ __ . __ __ __ ________				
33	Select bit count 45° (+30")	bits		________				(an)
33	CDU TRN 45° (+30")	deg		__ __ . __ __ __				(ao)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 13

JDC
NO. 10043
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
35	Calculate: Line (t) +00003 bits	bits		( ) ________				(ar)
35	Calculate: Line (an) - Line (ar) G & N Accuracy BITS 45° (+30")	bits	-2	( ) ________	+2			(as)
35	Calculate: Line (u) +00.017 deg	deg		( ) ________				(at)
35	Calculate: Line (ao) - Line (at) G & N Accuracy CDU 45° (+30")	deg		( ) ________				(au)
35	Calculate: Line (q) +60 sec	sec		( ) ________				(av)
35	Convert Line (av) to VDW reading using calibration chart	deg min		________ ________				(aw)

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 13

JDC
NO. 10043
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Record AGC display * and TRUNNION CDU 45° (+60")	CDU TRN ° R2 deg bits		__ __ . __ __ __ __ __ . __ __ __ ________				(ax)
		CDU TRN ° R2 deg bits		__ __ . __ __ __ __ __ . __ __ __ ________				
		CDU TRN ° R2 deg bits		__ __ . __ __ __ __ __ . __ __ __ ________				
39	Select bit count 45° (+60")	bits		________				(ay)
39	CDU TRN 45° (+60")	deg		__ __ . __ __ __				(az)
41	Calculate: Line (t) +00006 bits	bits		( ) ________				(bc)
41	Calculate: Line (ay) - Line (bc) G & N Accuracy BITS 45° (+60")	bits	-2	( ) ________	+2			(bd)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 13

JDC
NO. 10043
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
41	Calculate: Line (u) +00.033 deg	deg		( ) ________				(be)
41	Calculate: Line (az) - Line (be) G & N Accuracy CDU 45° (+60")	deg		( ) ________				(bf)
41	Calculate: Line (q) - 30 sec	sec		( ) ________				(bg)
41	Convert Line (bg) to VDW reading using calibration chart	deg min		________ ________				(bh)
44	Record AGC display * and TRUNNION CDU 45° (-30")	CDU TRN ° R2 deg bits		__ __ . __ __ __ __ __ . __ __ __ ________				(bk)
		CDU TRN ° R2 deg bits		__ __ . __ __ __ __ __ . __ __ __ ________				
		CDU TRN ° R2 deg bits		__ __ . __ __ __ __ __ . __ __ __ ________				
45	Select bit count 45° (-30")	bits		________				(bl)
45	CDU TRN 45° (-30")	deg		__ __ . __ __ __				(bm)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 OF 13

JDC
NO. 10043
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
47	Calculate: Line (t) -00003 bits	bits	▨	( )________	▨	▨	▨	(bp)
47	Calculate: Line (bl) - Line (bp) G & N Accuracy BITS 45° (-30")	bits	-2	( )________	+2			(bq)
47	Calculate: Line (u) -00.017 deg	deg	▨	( )________	▨	▨	▨	(br)
47	Calculate: Line (bm) -Line (br) G & N Accuracy CDU 45° (-30")	deg	▨	( )________	▨	▨	▨	(bs)
47	Calculate: Line (q) -90 sec	sec	▨	( )________	▨	▨	▨	(bt)
47	Convert Line (bt) to VDW reading using calibration chart	deg min	▨	________ ________	▨	▨	▨	(bu)
			▨		▨	▨	▨	

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EQUIPMENT TEST
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JDC
NO. 10043
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
50	Record AGC display * and TRUNNION CDU 45° (-90")	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ________	▨	▨	▨	(bv)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ________	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ________	▨	▨	▨	
51	Select bit count 45° (-90")	bits	▨	________	▨	▨	▨	(bw)
51	CDU TRN 45° (-90")	deg	▨	__ __ . __ __ __	▨	▨	▨	(bx)
53	Calculate: Line (t) -00009 bits	bits	▨	( )________	▨	▨	▨	(ca)
53	Calculate: Line (bw) - Line (ca) G & N Accuracy BITS 45° (-90")	bits	-2	( )________	+2			(cb)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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EQUIPMENT TEST
DATA SHEET 11 OF 13

JDC
NO. 10043
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
53	Calculate: Line (u) -00.050 deg	deg	▨	( )________	▨	▨	▨	(cc)
53	Calculate: Line (bx) - Line (cc) G & N Accuracy CDU 45° (-90")	deg	▨	( )________	▨	▨	▨	(cd)
53	Calculate: Line (q) -60 sec	sec	▨	( )________	▨	▨	▨	(ce)
53	Convert Line (ce) to VDW reading using calibration chart	deg min	▨	________ ________	▨	▨	▨	(cf)
56	Record AGC display * and TRUNNION CDU 45° (-60")	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ________	▨	▨	▨	(cg)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ________	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ________	▨	▨	▨	
57	Select bit count 45° (-60")	bits	▨	________	▨	▨	▨	(ch)
57	CDU TRN 45° (-60")	deg	▨	__ __ . __ __ __	▨	▨	▨	(ck)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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EQUIPMENT TEST
DATA SHEET 12 OF 13

JDC
NO. 10043
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	Calculate: Line (t) -00006 bits	bits	▨	( )________	▨	▨	▨	(cn)
59	Calculate: Line (ch) - Line (cn) G & N Accuracy BITS 45° (-60")	bits	-2	( )________	+2			(co)
59	Calculate: Line (u) -00.033 deg	deg	▨	( )________	▨	▨	▨	(cp)
59	Calculate: Line (ck) - Line (cp) G & N Accuracy CDU 45° (-60")	deg	▨	( )________	▨	▨	▨	(cq)
68	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cr)
69	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cs)
64 67	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(ct)
73	AGC DSKY indication	R_1 deg R_2 deg	▨	________ ________	▨	▨	▨	(cu)
80	TRUN DAC slew	sec	0	________	14.0			(cv)
83	Shaft DAC slew	sec	0	________	8.0			(cw)
85	AGC DSKY indication	R_1 deg R_2 deg	▨	________ ________	▨	▨	▨	(cx)

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 **OF** 13

JDC
NO. 10043
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
86	Calculate: Line (cx) R_1 - Line (cu) R_1 (SHAFT)	deg	-.022	( )__________	+.022			(cy)
86	Calculate: Line (cx) R_2 - Line (cu) R_2 (TRUNNION)	deg	-0.01	( )__________	+.01			(cz)
87	SXT shaft MDA input	mv	0	__________	100			(da)
87	SXT trunnion MDA input	mv	0	__________	100			(db)
93	SCT TRUNNION Counter	deg	24.66	( )__________	25.34			(dc)
93	SCT SHAFT Counter	deg	179.92	( )__________	180.08			(dd)
96	(SCT) TRUNNION R2 DSKY indication	deg	24.8	__________	25.2			(de)

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JOB OPTICS POSITIONAL ACCURACY TEST | **JDC** 10043 **REV.** D **PAGE** 1 **OF** 8
INITIAL TDRR 21539 **DS P3S** 13

SUBSYSTEM G & N SYSTEM | **ASSY.**

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and SXT slew characteristics in the COMPUTER mode are checked in this test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-28-65	22832	ALL	ALL	WK	WM
B	12-14-65	24682	2	13	WK	TM
C	3-8-66	26922	-	3, 13	WK	ACM
D	6-7-66	29399	1	-	MM	-

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1026000

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000 and Data Sheets 10043 and 10003. SCT Resolution Card.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

Data from JDC 10003 must be made available before proceeding with this JDC.

NOTE: The G & N Mounting Fixture shall be set at 0.0° position.

1. Insure that the SLAVE TELESCOPE switch on the G & N indicator control panel is set to STAR LOS and that the TRACK pushbutton lamp is not lighted and the TRACKER POWER switch is OFF.

2. Set the CONTROLLER MODE switch on the G & N indicator control panel to DIRECT and the CONTROLLER SPEED switch to HI.

3. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS and after one minute, record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.

4. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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with dot and horizontal reticle line of target #1.

5. Set OPTICS MODE switch to MANUAL. Pushinb the control stick to the right, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Set the CONTROLLER SPEED switch on the G & N indicator control panel to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU reads 270.000° and the 2X TRUNNION CDU reads the value recorded in step 3 line (a).

6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.

7. Cover SXT LLOS and repeat step 6 for the SXT StLOS while maintaining a 2X TRUNNION CDU reading of step 3 line (a) and SHAFT ANGLE CDU reading of 270.000° by manipulating control stick. Record VDW reading in line (e) of Data Sheet. Complete lines (d), (f) and (g) of Data Sheet.

8. Manipulate the control stick to position the SXT until the SHAFT ANGLE CDU indicates approximately 180.0° and the 2X TRUNNION CDU indicates approximately 000.0°.

9. Sight through SCT eyepiece and manipulate the control stick until central dot on reticle of atrget #2 is aligned to horizontal crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS. Wait one minute before proceeding.

12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeroes). Set OPTICS MODE switch to MANUAL.

13. Complete lines (p) (q) and (r) of Data Sheet. Set the CONTROLLER SPEED switch to HI.

14. Repeat step 5.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000°. Return the CONTROLLER SPEED switch to LO.

19. Manipulate the control stick vertically to position the SXT StLOS until central dot

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on reticle of target #3 approaches the vertical crosshair on the SXT reticle. At the instant of coincidence, simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel.

NOTE: VERB 06, NOUN 56 shall appear on G & N AGC DSKY indicating optical CDU and time displays.

20. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (s) of Data Sheet. Release thumbwheel. Repeat step 19 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

21. Observe the three bit counts of line (s) of Data Sheet. If two of the three counts are equal, record this count in line (t). If all three counts are different, record the count which falls between the smallest and the largest on line (t).

22. Record the TRUNNION CDU value from line (s) which corresponds to line (t) in line (u).

23. Complete lines (x) and (y) of Data Sheet.

24. Set VDW to value recorded in line (y) of Data Sheet.

25. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 approaches the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

26. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (z) of Data Sheet. Release thumbwheel. Repeat step 25 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

27. Observe the three bit counts of line (z) of Data Sheet. If two of the three counts are equal, record this count in line (aa). If all three counts are different, record the count which falls between the smallest and the largest in line (aa).

28. Record the TRUNNION CDU value from line (z) which corresponds to line (aa) in line (ab).

29. Complete lines (ae), (af), (ag), (ah), (ak), and (al) of Data Sheet.

30. Set VDW to value recorded in line (al) of Data Sheet.

31. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the verticle crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

32. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (am) of Data Sheet. Release thumbwheel. Repeat

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step 31 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

33. Observe the three bit counts of line (am) of Data Sheet. If two of the three counts are equal, record this count in line (an). If all three counts are different, record the count which falls between the smallest and the largest in line (an).

34. Record TRUNNION CDU value from line (am) which corresponds to line (an) in line (ao).

35. Complete lines (ar), (as), (at), (au), (av) and (aw) of Data Sheet.

36. Set VDW to value recorded in line (aw) of Data Sheet.

37. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

38. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (ax) of Data Sheet. Release thumbwheel. Repeat step 37 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

39. Observe the three bit counts of line (ax) of Data Sheet. If two of the three counts are equal, record this count in line (ay). If all three counts are different, record the count which falls between the smallest and the largest in line (ay).

40. Record the TRUNNION CDU value from line (ax) which corresponds to line (ay) in line (az).

41. Complete lines (bc), (bd), (be), (bf), (bg), and (bh) of Data Sheet.

42. Set VDW to value recorded in line (bh) of Data Sheet.

43. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

44. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bk) of Data Sheet. Release thumbwheel. Repeat step 43 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

45. Observe the three bit counts of line (bk) of Data Sheet. If two of the three counts are equal, record this count in line (bl). If all three counts are different, record the count which falls between the smallest and the largest in line (bl).

46. Record the TRUNNION CDU value from line (bk) which corresponds to line (bl) in line (bm).

47. Complete lines (bp), (bq), (br), (bs), (bt), and (bu) of Data Sheet.

48. Set VDW to value recorded in line (bu) of Data Sheet.

49. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

50. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bv) of Data Sheet. Repeat step 49 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

51. Observe the three bit counts of line (bv) of Data Sheet. If two of the three counts are equal, record this count in line (bw). If all three counts are different, record the count which falls between the smallest and the largest in line (bw).

52. Record the TRUNNION CDU value from line (bv) which corresponds to line (bw) in line (bx).

53. Complete lines (ca), (cb), (cc), (cd), (ce) and (cf) of Data Sheet.

54. Set VDW to value recorded in line (cf) of Data Sheet.

55. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

56. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (cg) of Data Sheet. Repeat step 55 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

57. Observe the three bit counts of line (cg) of Data Sheet. If two of the three counts are equal, record this count in line (ch). If all three counts are different, record the count which falls between the smallest and the largest in line (ch).

58. Record the TRUNNION CDU value from line (cg) which corresponds to line (ch) in line (ck).

59. Complete lines (cn), (co), (cp), and (cq) of Data Sheet.

60. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes OUT, return switch to MANUAL.

61. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Return the CONTROLLER SPEED switch to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU indicates 270.000°.

62. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N Mounting Fixture cradle.

63. Sight through the SXT StLOS and, using the control stick, position the approximate center of the SXT StLOS reticle

pattern to the number 10 resolution pattern of target #1.

64. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

65. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

66. Sight through the SCT LOS and, using the control stick, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

67. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

68. Set OPTICS MODE switch on G & N indicator panel to ZERO OPTICS. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFF-SET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT vertical reticle line.

69. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

70. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.

71. Set OPTICS MODE switch on G & N indicator control panel to MANUAL.

72. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000° and the SHAFT ANGLE CDU reads 270.000°. (Do not drive through 180.000°.) Return the CONTROLLER SPEED switch to LO and while sighting through the SXT eyepiece, use the control stick to drive the StLOS until the center of the SXT reticle pattern approaches the reticle dot of target #3. At the instant of coincidence press MARK pushbutton.

73. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cu) of Data Sheet.

74. Monitor TRUNNION CDU unconditioned square wave $-\Delta\theta$ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

75. Set following controls on PRIMARY SIGNAL SELECTOR panel:

COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
DIGITAL RECORDER SELECTOR to CTR.

77. Set the following controls on COUNTER:

SAMPLE TIME (N_1) to 002548
CLOCK FREQUENCY DIVIDER to 10
DISPLAY RESET to ZERO
CLOCK SELECTOR to INT
FUNCTION to Ratio or Period
INPUT SELECTOR to C SENSE

SENSE SELECTOR to FWD
ATTEN D to 10 AC
SLOPE to +
TRIGGER VOLTAGE - As required.

77. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter VERB 21, NOUN 01, press ENTER pushbutton. Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

78. Set the OPTICS MODE switch on G & N indicator control panel to COMPUTER.

79. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

80. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

81. Monitor SHAFT CDU unconditioned square wave $-\Delta\theta$ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N_1) on COUNTER to 002913.

82. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

83. Enter R1 from step 73 into G & N AGC DSKY. Press ENTER pushbutton. Enter R2 from step 73 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

84. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

85. Sight through SXT eyepiece. The center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cx) of Data Sheet.

86. Perform calculations (cy) and (cz) on Data Sheet.

87. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in-phase signals on the PAVM:

a. SXT shaft MDA input at 45A8J1 pins 9 (high) and 23 (low)
b. SXT trunnion MDA input at 45A8J1 pins 2 (high) and 1 (low)

Record indications in lines (da) and (db) of Data Sheet.

88. Adjust G & N MOUNTING FIXTURE to approximately +25°.

89. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes out, return switch to COMPUTER.

90. Enter VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

91. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

92. Enter +18000 into row 1 of G & N AGC DSKY. Press ENTER pushbutton. Enter +25000 into row 2 of G & N AGC DSKY. Press ENTER pushbutton.

93. Record the Telescope Panel Angle Counter shaft and trunnion indications on the data sheet.

94. Sight through SXT eyepiece and insure that horizontal reticle line of SXTis coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle.

95. Set the OPTICS MODE switch on G & N indicator control panel to MANUAL. Set the CONTROLLER SPEED switch to LO.

96. Sight through the SCT 1X eyepiece and manipulate the control stick vertically to position the SCT LOS until central horizontal reticle line of SCT approaches the central dot on the reticle of target #2. At the instant of coincidence press MARK pushbutton. Record indication of R2 of G & N AGC DSKY.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 13

JDC
NO. 10043
REV. D
INITIAL TDRR 21539

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST

TITLE ________
SER. NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ ________ CAL DATE
NAME ________ SER. NO. ________ ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
3	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ________	+0.006			(a)
3	Record SHAFT CDU indication	deg	-0.006	( ) ________	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min		________ ________				(c)
7	Convert Line (c) to sec. using Calibration Chart	Sec		( ) ________				(d)
6	Record VDW Reading of WSTLOS	Deg Min		________ ________				(e)
7	Convert Line (e) to sec. using calibration chart	sec		( ) ________				(f)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 13

JDC
NO. 10043
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
7	Calculate: Line (f) - Line (d) St LOS-LLOS parallelism	sec	-10	( ) ________	10			(g)
9	Record 2X TRUNNION CDU indication	deg		( ) ________				(h)
9	Record TRUNNION ANGLE indication TRN	deg		( ) ________				(k)
10	Calculate: Line (h) - Line (a) SCT-SXT parallelism	deg	-0.4	( ) ________	+0.4			(m)
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec		________ ________ ________				(n)
13	Calculate: 45° - line (n) to nearest second	Sec		( ) ________				(p)
13	Calculate: Line (p) + Line (d)	Sec		( ) ________				(q)

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 13

JDC
NO. 10043
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
13	Convert Line (q) to VDW reading using calibration chart **	Deg Min		________ ________				(r)
20	Record AGC display * and TRUNNION CDU 45°	CDU TRN ° R2 deg bits		— — . — — — — — . — — — ________				(s)
		CDU TRN ° R2 deg bits		— — . — — — — — . — — — ________				
		CDU TRN ° R2 deg bits		— — . — — — — — . — — — ________				
21	Select bit count 45°	bits	16382	________	16386			(t)
21	CDU TRN 45°	deg		— — . — — —				(u)
23	Calculate: Line (q) + 90 sec	sec		( ) ________				(x)
23	Convert Line (x) to VDW reading using calibration chart	deg min		________ ________				(y)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.
** If line (q) is -, add calibration chart indication to 0°0'.
If line (q) is +, subtract calibration chart indication from 359°60'.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 13

JDC
NO. 10043
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
26	Record AGC display * and TRUNNION CDU 45° (+ 90")	CDU TRN ° R2 deg bits		— — . — — — — — . — — — ________				(z)
		CDU TRN ° R2 deg bits		— — . — — — — — . — — — ________				
		CDU TRN ° R2 deg bits		— — . — — — — — . — — — ________				
27	Select bit count 45° (+ 90")	bits		________				(aa)
27	CDU TRN 45° (+ 90")	deg		— — . — — —				(ab)
29	Calculate: Line (t) + 00009 bits	bits		( ) ________				(ae)
29	Calculate: Line (aa) - Line (ae) G & N Accuracy BITS 45° (+ 90")	bits	-2	( ) ________	+2			(af)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 13

JDC
NO. 10043
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Calculate: Line (u) +00.050 deg	deg	▨	( ) ________	▨	▨	▨	(ag)
29	Calculate: Line (ab) - Line (ag) G & N Accuracy CDU 45° (+90")	deg	▨	( ) ________	▨	▨	▨	(ah)
29	Calculate: Line (q) + 30 sec	sec	▨	( ) ________	▨	▨	▨	(ak)
29	Convert Line (ak) to VDW reading using calibration chart	deg min	▨	________ ________	▨	▨	▨	(al)
32	Record AGC display * and TRUNNION CDU 45° (+30")	CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	(am)
		CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	
33	Select bit count 45° (+30")	bits	▨	________	▨	▨	▨	(an)
33	CDU TRN 45° (+30")	deg	▨	— — . — — —	▨	▨	▨	(ao)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 13

JDC
NO. 10043
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
35	Calculate: Line (t) +00003 bits	bits	▨	( ) ________	▨	▨	▨	(ar)
35	Calculate: Line (an) - Line (ar) G & N Accuracy BITS 45° (+30")	bits	-2	( ) ________	+2			(as)
35	Calculate: Line (u) +00.017 deg	deg	▨	( ) ________	▨	▨	▨	(at)
35	Calculate: Line (ao) - Line (at) G & N Accuracy CDU 45° (+30")	deg	▨	( ) ________	▨	▨	▨	(au)
35	Calculate: Line (q) +60 sec	sec	▨	( ) ________	▨	▨	▨	(av)
35	Convert Line (av) to VDW reading using calibration chart	deg min	▨	________ ________	▨	▨	▨	(aw)
			▨		▨	▨	▨	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 13

JDC
NO. 10043
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Record AGC display * and TRUNNION CDU 45° (+60")	CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	(ax)
		CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	
39	Select bit count 45° (+60")	bits	▨	________	▨	▨	▨	(ay)
39	CDU TRN 45° (+60")	deg	▨	— — . — — —	▨	▨	▨	(az)
41	Calculate: Line (t) +00006 bits	bits	▨	( ) ________	▨	▨	▨	(bc)
41	Calculate: Line (ay) - Line (bc) G & N Accuracy BITS 45° (+60")	bits	-2	( ) ________	+2			(bd)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 13

JDC
NO. 10043
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
41	Calculate: Line (u) +00.033 deg	deg	▨	( ) ________	▨	▨	▨	(be)
41	Calculate: Line (az) - Line (be) G & N Accuracy CDU 45° (+60")	deg	▨	( ) ________	▨	▨	▨	(bf)
41	Calculate: Line (q) - 30 sec	sec	▨	( ) ________	▨	▨	▨	(bg)
41	Convert Line (bg) to VDW reading using calibration chart	deg min	▨	________ ________	▨	▨	▨	(bh)
44	Record AGC display * and TRUNNION CDU 45° (-30")	CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	(bk)
		CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	— — . — — — — — . — — — ________	▨	▨	▨	
45	Select bit count 45° (-30")	bits	▨	________	▨	▨	▨	(bl)
45	CDU TRN 45° (-30")	deg	▨	— — . — — —	▨	▨	▨	(bm)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 13

JDC
NO. 10043
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
47	Calculate: Line (t) -00003 bits	bits	▨	( ) ____	▨	▨	▨	(bp)
47	Calculate: Line (bl) - Line (bp) G & N Accuracy BITS 45° (-30")	bits	-2	( ) ____	+2			(bq)
47	Calculate: Line (u) -00.017 deg	deg	▨	( ) ____	▨	▨	▨	(br)
47	Calculate: Line (bm) -Line (br) G & N Accuracy CDU 45° (-30")	deg	▨	( ) ____	▨	▨	▨	(bs)
47	Calculate: Line (q) -90 sec	sec	▨	( ) ____	▨	▨	▨	(bt)
47	Convert Line (bt) to VDW reading using calibration chart	deg min	▨	____ ____	▨	▨	▨	(bu)
			▨		▨	▨	▨	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 13

JDC
NO. 10043
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
50	Record AGC display * and TRUNNION CDU 45° (-90")	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ____	▨	▨	▨	(bv)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ____	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ____	▨	▨	▨	
51	Select bit count 45° (-90")	bits	▨	____	▨	▨	▨	(bw)
51	CDU TRN 45° (-90")	deg	▨	__ __ . __ __ __	▨	▨	▨	(bx)
53	Calculate: Line (t) -00009 bits	bits	▨	( ) ____	▨	▨	▨	(ca)
53	Calculate: Line (bw) - Line (ca) G & N Accuracy BITS 45° (-90")	bits	-2	( ) ____	+2			(cb)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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EQUIPMENT TEST
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JDC
NO. 10043
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM I.Q.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
53	Calculate: Line (u) -00.050 deg	deg	▨	( ) ____	▨	▨	▨	(cc)
53	Calculate: Line (bx) - Line (cc) G & N Accuracy CDU 45° (-90")	deg	▨	( ) ____	▨	▨	▨	(cd)
53	Calculate: Line (q) -60 sec	sec	▨	( ) ____	▨	▨	▨	(ce)
53	Convert Line (ce) to VDW reading using calibration chart	deg min	▨	____ ____	▨	▨	▨	(cf)
56	Record AGC display * and TRUNNION CDU 45° (-60")	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ____	▨	▨	▨	(cg)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ____	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ____	▨	▨	▨	
57	Select bit count 45° (-60")	bits	▨	____	▨	▨	▨	(ch)
57	CDU TRN 45° (-60")	deg	▨	__ __ . __ __ __	▨	▨	▨	(ck)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 13

JDC
NO. 10043
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	Calculate: Line (t) -00006 bits	bits	▨	( ) ____	▨	▨	▨	(cn)
59	Calculate: Line (ch) - Line (cn) G & N Accuracy BITS 45° (-60")	bits	-2	( ) ____	+2			(co)
59	Calculate: Line (u) -00.033 deg	deg	▨	( ) ____	▨	▨	▨	(cp)
59	Calculate: Line (ck) - Line (cp) G & N Accuracy CDU 45° (-60")	deg	▨	( ) ____	▨	▨	▨	(cq)
68	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cr)
69	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cs)
64 67	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(ct)
73	AGC DSKY indication	R_1 deg R_2 deg	▨	____ ____	▨	▨	▨	(cu)
80	TRUN DAC slew	sec	0	____	14.0			(cv)
83	Shaft DAC slew	sec	0	____	8.0			(cw)
85	AGC DSKY indication	R_1 deg R_2 deg	▨	____ ____	▨	▨	▨	(cx)

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DATA SHEET 13 **OF** 13

JDC
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JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
86	Calculate: Line (cx) R_1 - Line (cu) R_1 (SHAFT)	deg	-.022	( ) ______	+.022			(cy)
86	Calculate: Line (cx) R_2 - Line (cu) R_2 (TRUNNION)	deg	-0.01	( ) ______	+.01			(cz)
87	SXT shaft MDA input	mv	0	______	100			(da)
87	SXT trunnion MDA input	mv	0	______	100			(db)
93	SCT TRUNNION Counter	deg	24.66	( ) ______	25.34			(dc)
93	SCT SHAFT Counter	deg	179.92	( ) ______	180.08			(dd)
96	(SCT) TRUNNION R2 DSKY indication	deg	24.8	______	25.2			(de)

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JOB OPTICS POSITIONAL ACCURACY TEST | JDC 10043 REV. E PAGE 1 OF 8
INITIAL TDRR 21539 D.S. PGS 13

SUBSYSTEM G & N SYSTEM | ASSY.

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and SXT slew characteristics in the COMPUTER mode are checked in this test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	9-28-65	22832	ALL	ALL	WK	WM
B	12-14-65	24682	2	13	WK	TM
C	3-8-66	26922	-	3, 13	WK	ACM
D	6-7-66	29399	1	-	MM	-
E	8-18-66	30703	1	-	EA	-

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1026000

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000 and Data Sheets 10043 and 10003. SCT Resolution Card.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC. Data from JDC 10003 must be made available before proceeding with this JDC. In the event a system fails SXT LOS Parallelism or SXT StLOS Positional Accuracy Tests, JDC 10099 shall be performed.

NOTE: The G & N Mounting Fixture shall be set at 0.0° position.

1. Insure that the SLAVE TELESCOPE switch on the G & N indicator control panel is set to STAR LOS and that the TRACK pushbutton lamp is not lighted and the TRACKER POWER switch is OFF.

2. Set the CONTROLLER MODE switch on the G & N indicator control panel to DIRECT and the CONTROLLER SPEED switch to HI.

3. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS and after one minute, record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.

4. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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with dot and horizontal reticle line of target #1.

5. Set OPTICS MODE switch to MANUAL. Pushinb the control stick to the right, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Set the CONTROLLER SPEED switch on the G & N indicator control panel to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU reads 270.000° and the 2X TRUNNION CDU reads the value recorded in step 3 line (a).

6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.

7. Cover SXT LLOS and repeat step 6 for the SXT StLOS while maintaining a 2X TRUNNION CDU reading of step 3 line (a) and SHAFT ANGLE CDU reading of 270.000° by manipulating control stick. Record VDW reading in line (e) of Data Sheet. Complete lines (d), (f) and (g) of Data Sheet.

8. Manipulate the control stick to position the SXT until the SHAFT ANGLE CDU indicates approximately 180.0° and the 2X TRUNNION CDU indicates approximately 000.0°.

9. Sight through SCT eyepiece and manipulate the control stick until central dot on reticle of atrget #2 is aligned to horizontal crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS. Wait one minute before proceeding.

12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeroes). Set OPTICS MODE switch to MANUAL.

13. Complete lines (p) (q) and (r) of Data Sheet. Set the CONTROLLER SPEED switch to HI.

14. Repeat step 5.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000°. Return the CONTROLLER SPEED switch to LO.

19. Manipulate the control stick vertically to position the SXT StLOS until central dot

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on reticle of target #3 approaches the vertical crosshair on the SXT reticle. At the instant of coincidence, simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel.

NOTE: VERB 06, NOUN 56 shall appear on G & N AGC DSKY indicating optical CDU and time displays.

20. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (s) of Data Sheet. Release thumbwheel. Repeat step 19 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

21. Observe the three bit counts of line (s) of Data Sheet. If two of the three counts are equal, record this count in line (t). If all three counts are different, record the count which falls between the smallest and the largest on line (t).

22. Record the TRUNNION CDU value from line (s) which corresponds to line (t) in line (u).

23. Complete lines (x) and (y) of Data Sheet.

24. Set VDW to value recorded in line (y) of Data Sheet.

25. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 approaches the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

26. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (z) of Data Sheet. Release thumbwheel. Repeat step 25 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

27. Observe the three bit counts of line (z) of Data Sheet. If two of the three counts are equal, record this count in line (aa). If all three counts are different, record the count which falls between the smallest and the largest in line (aa).

28. Record the TRUNNION CDU value from line (z) which corresponds to line (aa) in line (ab).

29. Complete lines (ae), (af), (ag), (ah), (ak), and (al) of Data Sheet.

30. Set VDW to value recorded in line (al) of Data Sheet.

31. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the verticle crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

32. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (am) of Data Sheet. Release thumbwheel. Repeat

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step 31 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

33. Observe the three bit counts of line (am) of Data Sheet. If two of the three counts are equal, record this count in line (an). If all three counts are different, record the count which falls between the smallest and the largest in line (an).

34. Record TRUNNION CDU value from line (am) which corresponds to line (an) in line (ao).

35. Complete lines (ar), (as), (at), (au), (av) and (aw) of Data Sheet.

36. Set VDW to value recorded in line (aw) of Data Sheet.

37. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

38. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (ax) of Data Sheet. Release thumbwheel. Repeat step 37 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

39. Observe the three bit counts of line (ax) of Data Sheet. If two of the three counts are equal, record this count in line (ay). If all three counts are different, record the count which falls between the smallest and the largest in line (ay).

40. Record the TRUNNION CDU value from line (ax) which corresponds to line (ay) in line (az).

41. Complete lines (bc), (bd), (be), (bf), (bg), and (bh) of Data Sheet.

42. Set VDW to value recorded in line (bh) of Data Sheet.

43. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

44. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bk) of Data Sheet. Release thumbwheel. Repeat step 43 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

45. Observe the three bit counts of line (bk) of Data Sheet. If two of the three counts are equal, record this count in line (bl). If all three counts are different, record the count which falls between the smallest and the largest in line (bl).

46. Record the TRUNNION CDU value from line (bk) which corresponds to line (bl) in line (bm).

47. Complete lines (bp), (bq), (br), (bs), (bt), and (bu) of Data Sheet.

48. Set VDW to value recorded in line (bu) of Data Sheet.

49. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

50. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bv) of Data Sheet. Repeat step 49 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

51. Observe the three bit counts of line (bv) of Data Sheet. If two of the three counts are equal, record this count in line (bw). If all three counts are different, record the count which falls between the smallest and the largest in line (bw).

52. Record the TRUNNION CDU value from line (bv) which corresponds to line (bw) in line (bx).

53. Complete lines (ca), (cb), (cc), (cd), (ce) and (cf) of Data Sheet.

54. Set VDW to value recorded in line (cf) of Data Sheet.

55. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

56. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (cg) of Data Sheet. Repeat step 55 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

57. Observe the three bit counts of line (cg) of Data Sheet. If two of the three counts are equal, record this count in line (ch). If all three counts are different, record the count which falls between the smallest and the largest in line (ch).

58. Record the TRUNNION CDU value from line (cg) which corresponds to line (ch) in line (ck).

59. Complete lines (cn), (co), (cp), and (cq) of Data Sheet.

60. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes OUT, return switch to MANUAL.

61. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Return the CONTROLLER SPEED switch to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU indicates 270.000°.

62. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N Mounting Fixture cradle.

63. Sight through the SXT StLOS and, using the control stick, position the approximate center of the SXT StLOS reticle

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pattern to the number 10 resolution pattern of target #1.

64. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

65. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

66. Sight through the SCT LOS and, using the control stick, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

67. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

68. Set OPTICS MODE switch on G & N indicator panel to ZERO OPTICS. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFF-SET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT vertical reticle line.

69. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

70. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.

71. Set OPTICS MODE switch on G & N indicator control panel to MANUAL.

72. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000° and the SHAFT ANGLE CDU reads 270.000°. (Do not drive through 180.000°.) Return the CONTROLLER SPEED switch to LO and while sighting through the SXT eyepiece, use the control stick to drive the StLOS until the center of the SXT reticle pattern approaches the reticle dot of target #3. At the instant of coincidence press MARK pushbutton.

73. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cu) of Data Sheet.

74. Monitor TRUNNION CDU unconditioned square wave $-\Delta\theta$ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

75. Set following controls on PRIMARY SIGNAL SELECTOR panel:

COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
DIGITAL RECORDER SELECTOR to CTR.

77. Set the following controls on COUNTER:

SAMPLE TIME (N_1) to 002548
CLOCK FREQUENCY DIVIDER to 10
DISPLAY RESET to ZERO
CLOCK SELECTOR to INT
FUNCTION to Ratio or Period
INPUT SELECTOR to C SENSE

SENSE SELECTOR to FWD
ATTEN D to 10 AC
SLOPE to +
TRIGGER VOLTAGE - As required.

77. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter VERB 21, NOUN 01, press ENTER pushbutton. Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

78. Set the OPTICS MODE switch on G & N indicator control panel to COMPUTER.

79. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

80. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

81. Monitor SHAFT CDU unconditioned square wave $-\Delta\theta$ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N_1) on COUNTER to 002913.

82. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

83. Enter R1 from step 73 into G & N AGC DSKY. Press ENTER pushbutton. Enter R2 from step 73 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

84. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

85. Sight through SXT eyepiece. The center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cx) of Data Sheet.

86. Perform calculations (cy) and (cz) on Data Sheet.

87. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in-phase signals on the PAVM:

a. SXT shaft MDA input at 45A8J1 pins 9 (high) and 23 (low)
b. SXT trunnion MDA input at 45A8J1 pins 2 (high) and 1 (low)

Record indications in lines (da) and (db) of Data Sheet.

88. Adjust G & N MOUNTING FIXTURE to approximately +25°.

89. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes out, return switch to COMPUTER.

90. Enter VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

91. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

92. Enter +18000 into row 1 of G & N AGC DSKY. Press ENTER pushbutton. Enter +25000 into row 2 of G & N AGC DSKY. Press ENTER pushbutton.

93. Record the Telescope Panel Angle Counter shaft and trunnion indications on the data sheet.

94. Sight through SXT eyepiece and insure that horizontal reticle line of SXT is coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle.

95. Set the OPTICS MODE switch on G & N indicator control panel to MANUAL. Set the CONTROLLER SPEED switch to LO.

96. Sight through the SCT 1X eyepiece and manipulate the control stick vertically to position the SCT LOS until central horizontal reticle line of SCT approaches the central dot on the reticle of target #2. At the instant of coincidence press MARK pushbutton. Record indication of R2 of G & N AGC DSKY.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 13

JDC
NO. 10043
REV. E
INITIAL TDRR 21539

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST	**TEST HISTORY**
TITLE ______	DATE ______ START ______ END ______ SITE / LOCATION
SER. NO. ______ DWG ______ REV. ______	TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ ______ CAL DATE
NAME ______ SER. NO. ______ ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
3	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ______	+0.006			(a)
3	Record SHAFT CDU indication	deg	-0.006	( ) ______	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min	▨	______ ______	▨	▨	▨	(c)
7	Convert Line (c) to sec. using Calibration Chart	Sec	▨	( ) ______	▨	▨	▨	(d)
6	Record VDW Reading of WSTLOS	Deg Min	▨	______ ______	▨	▨	▨	(e)
7	Convert Line (e) to sec. using calibration chart	sec	▨	( ) ______	▨	▨	▨	(f)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 13

JDC
NO. 10043
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
7	Calculate: Line (f) - Line (d) StLOS-LLOS parallelism	sec	-10	( ) ______	10			(g)
9	Record 2X TRUNNION CDU indication	deg	▨	( ) ______	▨	▨	▨	(h)
9	Record TRUNNION ANGLE indication TRN	deg	▨	( ) ______	▨	▨	▨	(k)
10	Calculate: Line (h) - Line (a) SCT-SXT parallelism	deg	-0.4	( ) ______	+0.4			(m)
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec	▨	______ ______ ______	▨	▨	▨	(n)
13	Calculate: 45° - line (n) to nearest second	Sec	▨	( ) ______	▨	▨	▨	(p)
13	Calculate: Line (p) + Line (d)	Sec	▨	( ) ______	▨	▨	▨	(q)

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 **OF** 13

JDC
NO. 10043
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
13	Convert Line (q) to VDW reading using calibration chart **	Deg Min	▨	______ ______	▨	▨	▨	(r)
20	Record AGC display * and TRUNNION CDU 45°	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	(s)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	
21	Select bit count 45°	bits	16382	______	16386			(t)
21	CDU TRN 45°	deg	▨	__ __ . __ __ __	▨	▨	▨	(u)
23	Calculate: Line (q) + 90 sec	sec	▨	( ) ______	▨	▨	▨	(x)
23	Convert Line (x) to VDW reading using calibration chart	deg min	▨	______ ______	▨	▨	▨	(y)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.
** If line (q) is -, add calibration chart indication to 0°0'.
If line (q) is +, subtract calibration chart indication from 359°60'.

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 **OF** 13

JDC
NO. 10043
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
26	Record AGC display * and TRUNNION CDU 45° (+ 90")	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	(z)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	
27	Select bit count 45° (+ 90")	bits	▨	______	▨	▨	▨	(aa)
27	CDU TRN 45° (+ 90")	deg	▨	__ __ . __ __ __	▨	▨	▨	(ab)
29	Calculate: Line (t) +00009 bits	bits	▨	( ) ______	▨	▨	▨	(ae)
29	Calculate: Line (aa) - Line (ae) G & N Accuracy BITS 45° (+ 90")	bits	-2	( ) ______	+2			(af)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 13

JDC
NO. 10043
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Calculate: Line (u) +00.050 deg	deg		( )				(ag)
29	Calculate: Line (ab) - Line (ag) G & N Accuracy CDU 45° (+90")	deg		( )				(ah)
29	Calculate: Line (q) + 30 sec	sec		( )				(ak)
29	Convert Line (ak) to VDW reading using calibration chart	deg min						(al)
32	Record AGC display * and TRUNNION CDU 45° (+30")	CDU TRN ° R2 deg bits						(am)
		CDU TRN ° R2 deg bits						
		CDU TRN ° R2 deg bits						
33	Select bit count 45° (+30")	bits						(an)
33	CDU TRN 45° (+30")	deg						(ao)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 13

JDC
NO. 10043
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
35	Calculate: Line (t) +00003 bits	bits		( )				(ar)
35	Calculate: Line (an) - Line (ar) G & N Accuracy BITS 45° (+30")	bits	-2	( )	+2			(as)
35	Calculate: Line (u) +00.017 deg	deg		( )				(at)
35	Calculate: Line (ao) - Line (at) G & N Accuracy CDU 45° (+30")	deg		( )				(au)
35	Calculate: Line (q) +60 sec	sec		( )				(av)
35	Convert Line (av) to VDW reading using calibration chart	deg min						(aw)

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 13

JDC
NO. 10043
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Record AGC display * and TRUNNION CDU 45° (+60")	CDU TRN ° R2 deg bits						(ax)
		CDU TRN ° R2 deg bits						
		CDU TRN ° R2 deg bits						
39	Select bit count 45° (+60")	bits						(ay)
39	CDU TRN 45° (+60")	deg						(az)
41	Calculate: Line (t) +00006 bits	bits		( )				(bc)
41	Calculate: Line (ay) - Line (bc) G & N Accuracy BITS 45° (+60")	bits	-2	( )	+2			(bd)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 13

JDC
NO. 10043
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
41	Calculate: Line (u) +00.033 deg	deg		( )				(be)
41	Calculate: Line (az) - Line (be) G & N Accuracy CDU 45° (+60")	deg		( )				(bf)
41	Calculate: Line (q) - 30 sec	sec		( )				(bg)
41	Convert Line (bg) to VDW reading using calibration chart	deg min						(bh)
44	Record AGC display * and TRUNNION CDU 45° (-30")	CDU TRN ° R2 deg bits						(bk)
		CDU TRN ° R2 deg bits						
		CDU TRN ° R2 deg bits						
45	Select bit count 45° (-30")	bits						(bl)
45	CDU TRN 45° (-30")	deg						(bm)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 OF 13

JDC
NO. 10043
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
47	Calculate: Line (t) -00003 bits	bits	▨	( ) ______	▨	▨	▨	(bp)
47	Calculate: Line (bl) - Line (bp) G & N Accuracy BITS 45° (-30")	bits	-2	( ) ______	+2			(bq)
47	Calculate: Line (u) -00.017 deg	deg	▨	( ) ______	▨	▨	▨	(br)
47	Calculate: Line (bm) -Line (br) G & N Accuracy CDU 45° (-30")	deg	▨	( ) ______	▨	▨	▨	(bs)
47	Calculate: Line (q) -90 sec	sec	▨	( ) ______	▨	▨	▨	(bt)
47	Convert Line (bt) to VDW reading using calibration chart	deg min	▨	______ ______	▨	▨	▨	(bu)
			▨		▨	▨	▨	

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 OF 13

JDC
NO. 10043
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
50	Record AGC display * and TRUNNION CDU 45° (-90")	CDU TRN ° R2 deg bits	▨	___ . ___ ___ . ___ ______	▨	▨	▨	(bv)
		CDU TRN ° R2 deg bits	▨	___ . ___ ___ . ___ ______	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	___ . ___ ___ . ___ ______	▨	▨	▨	
51	Select bit count 45° (-90")	bits	▨	______	▨	▨	▨	(bw)
51	CDU TRN 45° (-90")	deg	▨	___ . ___	▨	▨	▨	(bx)
53	Calculate: Line (t) -00009 bits	bits	▨	( ) ______	▨	▨	▨	(ca)
53	Calculate: Line (bw) - Line (ca) G & N Accuracy BITS 45° (-90")	bits	-2	( ) ______	+2			(cb)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 OF 13

JDC
NO. 10043
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
53	Calculate: Line (u) -00.050 deg	deg	▨	( ) ______	▨	▨	▨	(cc)
53	Calculate: Line (bx) - Line (cc) G & N Accuracy CDU 45° (-90")	deg	▨	( ) ______	▨	▨	▨	(cd)
53	Calculate: Line (q) -60 sec	sec	▨	( ) ______	▨	▨	▨	(ce)
53	Convert Line (ce) to VDW reading using calibration chart	deg min	▨	______ ______	▨	▨	▨	(cf)
56	Record AGC display * and TRUNNION CDU 45° (-60")	CDU TRN ° R2 deg bits	▨	___ . ___ ___ . ___ ______	▨	▨	▨	(cg)
		CDU TRN ° R2 deg bits	▨	___ . ___ ___ . ___ ______	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	___ . ___ ___ . ___ ______	▨	▨	▨	
57	Select bit count 45° (-60")	bits	▨	______	▨	▨	▨	(ch)
57	CDU TRN 45° (-60")	deg	▨	___ . ___	▨	▨	▨	(ck)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 OF 13

JDC
NO. 10043
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	Calculate: Line (t) -00006 bits	bits	▨	( ) ______	▨	▨	▨	(cn)
59	Calculate: Line (ch) - Line (cn) G & N Accuracy BITS 45° (-60")	bits	-2	( ) ______	+2			(co)
59	Calculate: Line (u) -00.033 deg	deg	▨	( ) ______	▨	▨	▨	(cp)
59	Calculate: Line (ck) - Line (cp) G & N Accuracy CDU 45° (-60")	deg	▨	( ) ______	▨	▨	▨	(cq)
68	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cr)
69	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cs)
64 67	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(ct)
73	AGC DSKY indication	R_1 deg R_2 deg	▨	______ ______	▨	▨	▨	(cu)
80	TRUN DAC slew	sec	0	______	14.0			(cv)
83	Shaft DAC slew	sec	0	______	8.0			(cw)
85	AGC DSKY indication	R_1 deg R_2 deg	▨	______ ______	▨	▨	▨	(cx)

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 OF 13

JDC
NO. 10043
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
86	Calculate: Line (cx) R_1 - Line (cu) R_1 (SHAFT)	deg	-.022	( ) ________	+.022			(cy)
86	Calculate: Line (cx) R_2 - Line (cu) R_2 (TRUNNION)	deg	-0.01	( ) ________	+.01			(cz)
87	SXT shaft MDA input	mv	0	________	100			(da)
87	SXT trunnion MDA input	mv	0	________	100			(db)
93	SCT TRUNNION Counter	deg	24.66	( ) ________	25.34			(dc)
93	SCT SHAFT Counter	deg	179.92	( ) ________	180.08			(dd)
96	(SCT) TRUNNION R2 DSKY indication	deg	24.8	________	25.2			(de)

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JOB OPTICS POSITIONAL ACCURACY TEST | JDC 10043 REV. F PAGE 1 OF 8
INITIAL TDRR 21539 D.S. PGS 13

SUBSYSTEM G & N SYSTEM | ASSY.

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and SXT slew characteristics in the COMPUTER mode are checked in this test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-28-65	22832	ALL	ALL	WK	WM
B	12-14-65	24682	2	13	WK	TM
C	3-8-66	26922	-	3, 13	WK	ACM
D	6-7-66	29399	1	-	MM	-
E	8-18-66	30703	1	-	EA	-
F	1-19-67	32695	1, 2	2	EA	-

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1026000
JDC 19128

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000 and Data Sheets 10043 and 10003. SCT Resolution Card.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC. Data from JDC 10003 must be made available before proceeding with this JDC. In the event a system fails SXT LOS Parallelism or SXT StLOS Positional Accuracy Tests, JDC 10099 shall be performed.

Insure that JDC 19128 has been performed within the last six months.

NOTE: The G & N Mounting Fixture shall be set at 0.0° position.

1. Insure that the SLAVE TELESCOPE switch on the G & N indicator control panel is set to STAR LOS and that the TRACK pushbutton lamp is not lighted and the TRACKER POWER switch is OFF.

2. Set the CONTROLLER MODE switch on the G & N indicator control panel to DIRECT and the CONTROLLER SPEED switch to HI.

3. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS and after one minute, record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.

4. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident

VERIFICATION WITH SIDL REQUIRED BEFORE USE

with dot and horizontal reticle line of target #1.

5. Set OPTICS MODE switch to MANUAL. Manipulate the control stick to the right, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Set the CONTROLLER SPEED switch on the G & N indicator control panel to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU reads 270.000° and the 2X TRUNNION CDU reads the value recorded in step 3 line (a).

6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.

7. Cover SXT LLOS and repeat step 6 for the SXT StLOS while maintaining a 2X TRUNNION CDU reading of step 3 line (a) and SHAFT ANGLE CDU reading of 270.000° by manipulating control stick. Record VDW reading in line (e) of Data Sheet. Complete lines (d), (f) and (g) of Data Sheet.

8. Manipulate the control stick to position the SXT until the SHAFT ANGLE CDU indicates approximately 180.0° and the 2X TRUNNION CDU indicates approximately 000.0°.

9. Sight through SCT eyepiece and manipulate the control stick until central dot on reticle of atrget #2 is aligned to horizontal crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS. Wait one minute before proceeding.

12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeroes). Set OPTICS MODE switch to MANUAL.

13. Complete lines (p) (q) and (r) of Data Sheet. Set the CONTROLLER SPEED switch to HI.

14. Repeat step 5.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000°. Return the CONTROLLER SPEED switch to LO.

19. Manipulate the control stick vertically to position the SXT StLOS until central dot

on reticle of target #3 approaches the vertical crosshair on the SXT reticle. At the instant of coincidence, simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel.

NOTE: VERB 06, NOUN 56 shall appear on G & N AGC DSKY indicating optical CDU and time displays.

20. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (s) of Data Sheet. Release thumbwheel. Repeat step 19 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

21. Observe the three bit counts of line (s) of Data Sheet. If two of the three counts are equal, record this count in line (t). If all three counts are different, record the count which falls between the smallest and the largest on line (t).

22. Record the TRUNNION CDU value from line (s) which corresponds to line (t) in line (u).

23. Complete lines (x) and (y) of Data Sheet.

24. Set VDW to value recorded in line (y) of Data Sheet.

25. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 approaches the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

26. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (z) of Data Sheet. Release thumbwheel. Repeat step 25 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

27. Observe the three bit counts of line (z) of Data Sheet. If two of the three counts are equal, record this count in line (aa). If all three counts are different, record the count which falls between the smallest and the largest in line (aa).

28. Record the TRUNNION CDU value from line (z) which corresponds to line (aa) in line (ab).

29. Complete lines (ae), (af), (ag), (ah), (ak), and (al) of Data Sheet.

30. Set VDW to value recorded in line (al) of Data Sheet.

31. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the verticle crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

32. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (am) of Data Sheet. Release thumbwheel. Repeat

step 31 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

33. Observe the three bit counts of line (am) of Data Sheet. If two of the three counts are equal, record this count in line (an). If all three counts are different, record the count which falls between the smallest and the largest in line (an).

34. Record TRUNNION CDU value from line (am) which corresponds to line (an) in line (ao).

35. Complete lines (ar), (as), (at), (au), (av) and (aw) of Data Sheet.

36. Set VDW to value recorded in line (aw) of Data Sheet.

37. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

38. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (ax) of Data Sheet. Release thumbwheel. Repeat step 37 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

39. Observe the three bit counts of line (ax) of Data Sheet. If two of the three counts are equal, record this count in line (ay). If all three counts are different, record the count which falls between the smallest and the largest in line (ay).

40. Record the TRUNNION CDU value from line (ax) which corresponds to line (ay) in line (az).

41. Complete lines (bc), (bd), (be), (bf), (bg), and (bh) of Data Sheet.

42. Set VDW to value recorded in line (bh) of Data Sheet.

43. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

44. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bk) of Data Sheet. Release thumbwheel. Repeat step 43 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

45. Observe the three bit counts of line (bk) of Data Sheet. If two of the three counts are equal, record this count in line (bl). If all three counts are different, record the count which falls between the smallest and the largest in line (bl).

46. Record the TRUNNION CDU value from line (bk) which corresponds to line (bl) in line (bm).

47. Complete lines (bp), (bq), (br), (bs), (bt), and (bu) of Data Sheet.

48. Set VDW to value recorded in line (bu) of Data Sheet.

JOB OPTICS POSITIONAL ACCURACY TEST | JDC 10043 REV. F PAGE 1 OF 8

INITIAL TDRR 21539 D.S. PGS 13

SUBSYSTEM G & N SYSTEM | ASSY.

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and SXT slew characteristics in the COMPUTER mode are checked in this test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	9-28-65	22832	ALL	ALL	WK	WM
B	12-14-65	24682	2	13	WK	TM
C	3-8-66	26922	-	3, 13	WK	ACM
D	6-7-66	29399	1	-	MM	-
E	8-18-66	30703	1	-	EA	-
F	1-19-67	32695	1, 2	2	EA	-

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1026000 JDC 19128

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000 and Data Sheets 10043 and 10003. SCT Resolution Card.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC. Data from JDC 10003 must be made available before proceeding with this JDC. In the event a system fails SXT LOS Parallelism or SXT StLOS Positional Accuracy Tests, JDC 10099 shall be performed.

Insure that JDC 19128 has been performed within the last six months.

NOTE: The G & N Mounting Fixture shall be set at 0.0° position.

1. Insure that the SLAVE TELESCOPE switch on the G & N indicator control panel is set to STAR LOS and that the TRACK pushbutton lamp is not lighted and the TRACKER POWER switch is OFF.

2. Set the CONTROLLER MODE switch on the G & N indicator control panel to DIRECT and the CONTROLLER SPEED switch to HI.

3. Set the OPTICS MODE switch on the G & N indicator control panel to ZERO OPTICS and after one minute, record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.

4. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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with dot and horizontal reticle line of target #1.

5. Set OPTICS MODE switch to MANUAL. Manipulate the control stick to the right, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Set the CONTROLLER SPEED switch on the G & N indicator control panel to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU reads 270.000° and the 2X TRUNNION CDU reads the value recorded in step 3 line (a).

6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.

7. Cover SXT LLOS and repeat step 6 for the SXT StLOS while maintaining a 2X TRUNNION CDU reading of step 3 line (a) and SHAFT ANGLE CDU reading of 270.000° by manipulating control stick. Record VDW reading in line (e) of Data Sheet. Complete lines (d), (f) and (g) of Data Sheet.

8. Manipulate the control stick to position the SXT until the SHAFT ANGLE CDU indicates approximately 180.0° and the 2X TRUNNION CDU indicates approximately 000.0°.

9. Sight through SCT eyepiece and manipulate the control stick until central dot on reticle of atrget #2 is aligned to horizontal crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS. Wait one minute before proceeding.

12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeroes). Set OPTICS MODE switch to MANUAL.

13. Complete lines (p) (q) and (r) of Data Sheet. Set the CONTROLLER SPEED switch to HI.

14. Repeat step 5.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000°. Return the CONTROLLER SPEED switch to LO.

19. Manipulate the control stick vertically to position the SXT StLOS until central dot

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on reticle of target #3 approaches the vertical crosshair on the SXT reticle. At the instant of coincidence, simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel.

NOTE: VERB 06, NOUN 56 shall appear on G & N AGC DSKY indicating optical CDU and time displays.

20. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (s) of Data Sheet. Release thumbwheel. Repeat step 19 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

21. Observe the three bit counts of line (s) of Data Sheet. If two of the three counts are equal, record this count in line (t). If all three counts are different, record the count which falls between the smallest and the largest on line (t).

22. Record the TRUNNION CDU value from line (s) which corresponds to line (t) in line (u).

23. Complete lines (x) and (y) of Data Sheet.

24. Set VDW to value recorded in line (y) of Data Sheet.

25. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 approaches the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

26. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (z) of Data Sheet. Release thumbwheel. Repeat step 25 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

27. Observe the three bit counts of line (z) of Data Sheet. If two of the three counts are equal, record this count in line (aa). If all three counts are different, record the count which falls between the smallest and the largest in line (aa).

28. Record the TRUNNION CDU value from line (z) which corresponds to line (aa) in line (ab).

29. Complete lines (ae), (af), (ag), (ah), (ak), and (al) of Data Sheet.

30. Set VDW to value recorded in line (al) of Data Sheet.

31. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the verticle crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

32. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (am) of Data Sheet. Release thumbwheel. Repeat

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step 31 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

33. Observe the three bit counts of line (am) of Data Sheet. If two of the three counts are equal, record this count in line (an). If all three counts are different, record the count which falls between the smallest and the largest in line (an).

34. Record TRUNNION CDU value from line (am) which corresponds to line (an) in line (ao).

35. Complete lines (ar), (as), (at), (au), (av) and (aw) of Data Sheet.

36. Set VDW to value recorded in line (aw) of Data Sheet.

37. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

38. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (ax) of Data Sheet. Release thumbwheel. Repeat step 37 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

39. Observe the three bit counts of line (ax) of Data Sheet. If two of the three counts are equal, record this count in line (ay). If all three counts are different, record the count which falls between the smallest and the largest in line (ay).

40. Record the TRUNNION CDU value from line (ax) which corresponds to line (ay) in line (az).

41. Complete lines (bc), (bd), (be), (bf), (bg), and (bh) of Data Sheet.

42. Set VDW to value recorded in line (bh) of Data Sheet.

43. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

44. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bk) of Data Sheet. Release thumbwheel. Repeat step 43 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

45. Observe the three bit counts of line (bk) of Data Sheet. If two of the three counts are equal, record this count in line (bl). If all three counts are different, record the count which falls between the smallest and the largest in line (bl).

46. Record the TRUNNION CDU value from line (bk) which corresponds to line (bl) in line (bm).

47. Complete lines (bp), (bq), (br), (bs), (bt), and (bu) of Data Sheet.

48. Set VDW to value recorded in line (bu) of Data Sheet.

49. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

50. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bv) of Data Sheet. Repeat step 49 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

51. Observe the three bit counts of line (bv) of Data Sheet. If two of the three counts are equal, record this count in line (bw). If all three counts are different, record the count which falls between the smallest and the largest in line (bw).

52. Record the TRUNNION CDU value from line (bv) which corresponds to line (bw) in line (bx).

53. Complete lines (ca), (cb), (cc), (cd), (ce) and (cf) of Data Sheet.

54. Set VDW to value recorded in line (cf) of Data Sheet.

55. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

56. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (cg) of Data Sheet. Repeat step 55 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

57. Observe the three bit counts of line (cg) of Data Sheet. If two of the three counts are equal, record this count in line (ch). If all three counts are different, record the count which falls between the smallest and the largest in line (ch).

58. Record the TRUNNION CDU value from line (cg) which corresponds to line (ch) in line (ck).

59. Complete lines (cn), (co), (cp), and (cq) of Data Sheet.

60. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes OUT, return switch to MANUAL.

61. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Return the CONTROLLER SPEED switch to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU indicates 270.000°.

62. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N Mounting Fixture cradle.

63. Sight through the SXT StLOS and, using the control stick, position the approximate center of the SXT StLOS reticle

pattern to the number 10 resolution pattern of target #1.

64. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

65. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

66. Sight through the SCT LOS and, using the control stick, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

67. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

68. Set OPTICS MODE switch on G & N indicator panel to ZERO OPTICS. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFF-SET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT vertical reticle line.

69. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

70. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.

71. Set OPTICS MODE switch on G & N indicator control panel to MANUAL.

72. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000° and the SHAFT ANGLE CDU reads 270.000°. (Do not drive through 180.000°.) Return the CONTROLLER SPEED switch to LO and while sighting through the SXT eyepiece, use the control stick to drive the StLOS until the center of the SXT reticle pattern approaches the reticle dot of target #3. At the instant of coincidence press MARK pushbutton.

73. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cu) of Data Sheet.

74. Monitor TRUNNION CDU unconditioned square wave -Δθ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

75. Set following controls on PRIMARY SIGNAL SELECTOR panel:
    COUNTER INPUT "D" PULSE to 13
    D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
    DIGITAL RECORDER SELECTOR to CTR.

77. Set the following controls on COUNTER:
    SAMPLE TIME (N_1) to 002548
    CLOCK FREQUENCY DIVIDER to 10
    DISPLAY RESET to ZERO
    CLOCK SELECTOR to INT
    FUNCTION to Ratio or Period
    INPUT SELECTOR to C SENSE

    SENSE SELECTOR to FWD
    ATTEN D to 10 AC
    SLOPE to +
    TRIGGER VOLTAGE - As required.

77. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter VERB 21, NOUN 01, press ENTER pushbutton. Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

78. Set the OPTICS MODE switch on G & N indicator control panel to COMPUTER.

79. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

80. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

81. Monitor SHAFT CDU unconditioned square wave -Δθ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N_1) on COUNTER to 002913.

82. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

83. Enter R1 from step 73 into G & N AGC DSKY. Press ENTER pushbutton. Enter R2 from step 73 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

84. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

85. Sight through SXT eyepiece. The center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cx) of Data Sheet.

86. Perform calculations (cy) and (cz) on Data Sheet.

87. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in-phase signals on the PAVM:

a. SXT shaft MDA input at 45A8J1 pins 9 (high) and 23 (low)

b. SXT trunnion MDA input at 45A8J1 pins 2 (high) and 1 (low)

Record indications in lines (da) and (db) of Data Sheet.

88. Adjust G & N MOUNTING FIXTURE to approximately +25°.

89. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes out, return switch to COMPUTER.

90. Enter VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

91. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

92. Enter +18000 into row 1 of G & N AGC DSKY. Press ENTER pushbutton. Enter +25000 into row 2 of G & N AGC DSKY. Press ENTER pushbutton.

93. Record the Telescope Panel Angle Counter shaft and trunnion indications on the data sheet.

94. Sight through SXT eyepiece and insure that horizontal reticle line of SXT is coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle.

95. Set the OPTICS MODE switch on G & N indicator control panel to MANUAL. Set the CONTROLLER SPEED switch to LO.

96. Sight through the SCT 1X eyepiece and manipulate the control stick vertically to position the SCT LOS until central horizontal reticle line of SCT approaches the central dot on the reticle of target #2. At the instant of coincidence press MARK pushbutton. Record indication of R2 of G & N AGC DSKY.

49. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

50. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bv) of Data Sheet. Repeat step 49 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

51. Observe the three bit counts of line (bv) of Data Sheet. If two of the three counts are equal, record this count in line (bw). If all three counts are different, record the count which falls between the smallest and the largest in line (bw).

52. Record the TRUNNION CDU value from line (bv) which corresponds to line (bw) in line (bx).

53. Complete lines (ca), (cb), (cc), (cd), (ce) and (cf) of Data Sheet.

54. Set VDW to value recorded in line (cf) of Data Sheet.

55. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

56. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (cg) of Data Sheet. Repeat step 55 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

57. Observe the three bit counts of line (cg) of Data Sheet. If two of the three counts are equal, record this count in line (ch). If all three counts are different, record the count which falls between the smallest and the largest in line (ch).

58. Record the TRUNNION CDU value from line (cg) which corresponds to line (ch) in line (ck).

59. Complete lines (cn), (co), (cp), and (cq) of Data Sheet.

60. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes OUT, return switch to MANUAL.

61. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Return the CONTROLLER SPEED switch to LO and manipulate the control stick to fine position and hold the SXT so that the SHAFT ANGLE CDU indicates 270.000°.

62. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N Mounting Fixture cradle.

63. Sight through the SXT StLOS and, using the control stick, position the approximate center of the SXT StLOS reticle

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pattern to the number 10 resolution pattern of target #1.

64. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

65. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

66. Sight through the SCT LOS and, using the control stick, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

67. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

68. Set OPTICS MODE switch on G & N indicator panel to ZERO OPTICS. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFF-SET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT vertical reticle line.

69. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

70. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.

71. Set OPTICS MODE switch on G & N indicator control panel to MANUAL.

72. Set the CONTROLLER SPEED switch on the G & N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000° and the SHAFT ANGLE CDU reads 270.000°. (Do not drive through 180.000°.) Return the CONTROLLER SPEED switch to LO and while sighting through the SXT eyepiece, use the control stick to drive the StLOS until the center of the SXT reticle pattern approaches the reticle dot of target #3. At the instant of coincidence press MARK pushbutton.

73. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cu) of Data Sheet.

74. Monitor TRUNNION CDU unconditioned square wave -Δθ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

75. Set following controls on PRIMARY SIGNAL SELECTOR panel:

COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
DIGITAL RECORDER SELECTOR to CTR.

77. Set the following controls on COUNTER:

SAMPLE TIME (N_1) to 002548
CLOCK FREQUENCY DIVIDER to 10
DISPLAY RESET to ZERO
CLOCK SELECTOR to INT
FUNCTION to Ratio or Period
INPUT SELECTOR to C SENSE

SENSE SELECTOR to FWD
ATTEN D to 10 AC
SLOPE to +
TRIGGER VOLTAGE - As required.

77. Enter VERB 36 into G & N AGC DSKY. Press ENTER pushbutton. Enter VERB 21, NOUN 01, press ENTER pushbutton. Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

78. Set the OPTICS MODE switch on G & N indicator control panel to COMPUTER.

79. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

80. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

81. Monitor SHAFT CDU unconditioned square wave -Δθ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N_1) on COUNTER to 002913.

82. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

83. Enter R1 from step 73 into G & N AGC DSKY. Press ENTER pushbutton. Enter R2 from step 73 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

84. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

85. Sight through SXT eyepiece. The center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as R1 and R2, respectively, in line (cx) of Data Sheet.

86. Perform calculations (cy) and (cz) on Data Sheet.

87. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in-phase signals on the PAVM:

a. SXT shaft MDA input at 45A8J1 pins 9 (high) and 23 (low)
b. SXT trunnion MDA input at 45A8J1 pins 2 (high) and 1 (low)

Record indications in lines (da) and (db) of Data Sheet.

88. Adjust G & N MOUNTING FIXTURE to approximately +25°.

89. Set OPTICS MODE switch on G & N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes out, return switch to COMPUTER.

90. Enter VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

91. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

92. Enter +18000 into row 1 of G & N AGC DSKY. Press ENTER pushbutton. Enter +25000 into row 2 of G & N AGC DSKY. Press ENTER pushbutton.

93. Record the Telescope Panel Angle Counter shaft and trunnion indications on the data sheet.

94. Sight through SXT eyepiece and insure that horizontal reticle line of SXT is coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle.

95. Set the OPTICS MODE switch on G & N indicator control panel to MANUAL. Set the CONTROLLER SPEED switch to LO.

96. Sight through the SCT 1X eyepiece and manipulate the control stick vertically to position the SCT LOS until central horizontal reticle line of SCT approaches the central dot on the reticle of target #2. At the instant of coincidence press MARK pushbutton. Record indication of R2 of G & N AGC DSKY.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 13

JDC
NO. 10043
REV. F
INITIAL TDRR 2 539

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE ______
NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
3	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ______	+0.006			(a)
3.	Record SHAFT CDU indication	deg	-0.006	( ) ______	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min	▨	______ ______	▨	▨	▨	(c)
7	Convert Line (c) to sec. using Calibration Chart	Sec	▨	( ) ______	▨	▨	▨	(d)
6	Record VDW Reading of WSTLOS	Deg Min	▨	______ ______	▨	▨	▨	(e)
7	Convert Line (e) to sec. using calibration chart	sec	▨	( ) ______	▨	▨	▨	(f)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 13

JDC
NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
7	Calculate: Line (f) - Line (d) + Horizontal Error from JDC 19128, step A.19. StLOS-LLOS parallelism	sec	-10	( ) ______	+10			(g)
9	Record 2X TRUNNION CDU indication	deg	▨	( ) ______	▨	▨	▨	(h)
9	Record TRUNNION ANGLE indication TRN	deg	▨	( ) ______	▨	▨	▨	(k)
10	Calculate: Line (h) - Line (a) SCT-SXT parallelism	deg	-0.4	( ) ______	+0.4			(m)
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec	▨	______ ______ ______	▨	▨	▨	(n)
13	Calculate: 45° - line (n) to nearest second	Sec	▨	( ) ______	▨	▨	▨	(p)

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 13

JDC
NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
13	Calculate: Line (p) + Line (d)	Sec	▨	( ) ______	▨	▨	▨	(q)
13	Convert Line (q) to VDW reading using calibration chart **	Deg Min	▨	______ ______	▨	▨	▨	(r)
20	Record AGC display * and TRUNNION CDU 45°	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	(s)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	
21	Select bit count 45°	bits	16382	______	16386			(t)
21	CDU TRN 45°	deg	▨	__ __ . __ __ __	▨	▨	▨	(u)
23	Calculate: Line (q) + 90 sec	sec	▨	( ) ______	▨	▨	▨	(x)
23	Convert Line (x) to VDW reading using calibration chart	deg min	▨	______ ______	▨	▨	▨	(y)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.
** If line (q) is -, add calibration chart indication to 0°0'.
If line (q) is +, subtract calibration chart indication from 359°60'.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 13

JDC
NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
26	Record AGC display * and TRUNNION CDU 45° (+ 90")	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	(z)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ______	▨	▨	▨	
27	Select bit count 45° (+ 90")	bits	▨	______	▨	▨	▨	(aa)
27	CDU TRN 45° (+ 90")	deg	▨	__ __ . __ __ __	▨	▨	▨	(ab)
29	Calculate: Line (t) + 00009 bits	bits	▨	( ) ______	▨	▨	▨	(ae)
29	Calculate: Line (aa) - Line (ae) G & N Accuracy BITS 45° (+ 90")	bits	-2	( ) ______	+2			(af)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 13

JDC
NO. 10043
REV. F
INITIAL TDRR 21539

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST	TEST HISTORY
TITLE ____	DATE ____ START ____ END ____ SITE / LOCATION
SER. NO. ____ DWG ____ REV. ____	TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
3	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ____	+0.006			(a)
3	Record SHAFT CDU indication	deg	-0.006	( ) ____	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min		____ ____				(c)
7	Convert Line (c) to sec. using Calibration Chart	Sec		( ) ____				(d)
6	Record VDW Reading of WSTLOS	Deg Min		____ ____				(e)
7	Convert Line (e) to sec. using calibration chart	sec		( ) ____				(f)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 13

JDC
NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
7	Calculate: Line (f) - Line (d) + Horizontal Error from JDC 19128, step A.19. StLOS-LLOS parallelism	sec	-10	( ) ____	+10			(g)
9	Record 2X TRUNNION CDU indication	deg		( ) ____				(h)
9	Record TRUNNION ANGLE indication TRN	deg		( ) ____				(k)
10	Calculate: Line (h) - Line (a) SCT-SXT parallelism	deg	-0.4	( ) ____	+0.4			(m)
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec		____ ____ ____				(n)
13	Calculate: 45° - line (n) to nearest second	Sec		( ) ____				(p)

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 **OF** 13

JDC
NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
13	Calculate: Line (p) + Line (d)	Sec		( ) ____				(q)
13	Convert Line (q) to VDW reading using calibration chart **	Deg Min		____ ____				(r)
20	Record AGC display * and TRUNNION CDU 45°	CDU TRN ° R2 deg bits		_ _ . _ _ _ _ _ . _ _ _				(s)
		CDU TRN ° R2 deg bits		_ _ . _ _ _ _ _ . _ _ _				
		CDU TRN ° R2 deg bits		_ _ . _ _ _ _ _ . _ _ _				
21	Select bit count 45°	bits	16382	____	16386			(t)
21	CDU TRN 45°	deg		_ _ . _ _ _				(u)
23	Calculate: Line (q) + 90 sec	sec		( ) ____				(x)
23	Convert Line (x) to VDW reading using calibration chart	deg min		____ ____				(y)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.
** If line (q) is -, add calibration chart indication to 0°0'.
If line (q) is +, subtract calibration chart indication from 359°60'.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 **OF** 13

JDC
NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
26	Record AGC display * and TRUNNION CDU 45° (+ 90")	CDU TRN ° R2 deg bits		_ _ . _ _ _ _ _ . _ _ _				(z)
		CDU TRN ° R2 deg bits		_ _ . _ _ _ _ _ . _ _ _				
		CDU TRN ° R2 deg bits		_ _ . _ _ _ _ _ . _ _ _				
27	Select bit count 45° (+ 90")	bits		____				(aa)
27	CDU TRN 45° (+ 90")	deg		_ _ . _ _ _				(ab)
29	Calculate: Line (t) + 00009 bits	bits		( ) ____				(ae)
29	Calculate: Line (aa) - Line (ae) G & N Accuracy BITS 45° (+ 90")	bits	-2	( ) ____	+2			(af)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 13

JDC
NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Calculate: Line (u) +00.050 deg	deg	▨	( )	▨	▨	▨	(ag)
29	Calculate: Line (ab) - Line (ag) G & N Accuracy CDU 45° (+90")	deg	▨	( )	▨	▨	▨	(ah)
29	Calculate: Line (q) + 30 sec	sec	▨	( )	▨	▨	▨	(ak)
29	Convert Line (ak) to VDW reading using calibration chart	deg min	▨		▨	▨	▨	(al)
32	Record AGC display * and TRUNNION CDU 45° (+30")	CDU TRN ° R2 deg bits	▨		▨	▨	▨	(am)
		CDU TRN ° R2 deg bits	▨		▨	▨	▨	
		CDU TRN ° R2 deg bits	▨		▨	▨	▨	
33	Select bit count 45° (+30")	bits	▨		▨	▨	▨	(an)
33	CDU TRN 45° (+30")	deg	▨		▨	▨	▨	(ao)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 13

JDC
NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
35	Calculate: Line (t) +00003 bits	bits	▨	( )	▨	▨	▨	(ar)
35	Calculate: Line (an) - Line (ar) G & N Accuracy BITS 45° (+30")	bits	-2	( )	+2			(as)
35	Calculate: Line (u) +00.017 deg	deg	▨	( )	▨	▨	▨	(at)
35	Calculate: Line (ao) - Line (at) G & N Accuracy CDU 45° (+30")	deg	▨	( )	▨	▨	▨	(au)
35	Calculate: Line (q) +60 sec	sec	▨	( )	▨	▨	▨	(av)
35	Convert Line (av) to VDW reading using calibration chart	deg min	▨		▨	▨	▨	(aw)
			▨		▨	▨	▨	

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 13

JDC
NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Record AGC display * and TRUNNION CDU 45° (+60")	CDU TRN ° R2 deg bits	▨		▨	▨	▨	(ax)
		CDU TRN ° R2 deg bits	▨		▨	▨	▨	
		CDU TRN ° R2 deg bits	▨		▨	▨	▨	
39	Select bit count 45° (+60")	bits	▨		▨	▨	▨	(ay)
39	CDU TRN 45° (+60")	deg	▨		▨	▨	▨	(az)
41	Calculate: Line (t) +00006 bits	bits	▨	( )	▨	▨	▨	(bo)
41	Calculate: Line (ay) - Line (bo) G & N Accuracy BITS 45° (+60")	bits	-2	( )	+2			(bd)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 13

JDC
NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
41	Calculate: Line (u) +00.033 deg	deg	▨	( )	▨	▨	▨	(be)
41	Calculate: Line (az) - Line (be) G & N Accuracy CDU 45° (+60")	deg	▨	( )	▨	▨	▨	(bf)
41	Calculate: Line (q) - 30 sec	sec	▨	( )	▨	▨	▨	(bg)
41	Convert Line (bg) to VDW reading using calibration chart	deg min	▨		▨	▨	▨	(bh)
44	Record AGC display * and TRUNNION CDU 45° (-30")	CDU TRN ° R2 deg bits	▨		▨	▨	▨	(bk)
		CDU TRN ° R2 deg bits	▨		▨	▨	▨	
		CDU TRN ° R2 deg bits	▨		▨	▨	▨	
45	Select bit count 45° (-30")	bits	▨		▨	▨	▨	(bl)
45	CDU TRN 45° (-30")	deg	▨		▨	▨	▨	(bm)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 13

JDC NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Calculate: Line (u) +00.050 deg	deg		( )				(ag)
29	Calculate: Line (ab) - Line (ag) G & N Accuracy CDU 45° (+90")	deg		( )				(ah)
29	Calculate: Line (q) + 30 sec	sec		( )				(ak)
29	Convert Line (ak) to VDW reading using calibration chart	deg min						(al)
32	Record AGC display * and TRUNNION CDU 45° (+30")	CDU TRN ° R2 deg bits						(am)
		CDU TRN ° R2 deg bits						
		CDU TRN ° R2 deg bits						
33	Select bit count 45° (+30")	bits						(an)
33	CDU TRN 45° (+30")	deg						(ao)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 13

JDC NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
35	Calculate: Line (t) +00003 bits	bits		( )				(ar)
35	Calculate: Line (an) - Line (ar) G & N Accuracy BITS 45° (+30")	bits	-2	( )	+2			(as)
35	Calculate: Line (u) +00.017 deg	deg		( )				(at)
35	Calculate: Line (ao) - Line (at) G & N Accuracy CDU 45° (+30")	deg		( )				(au)
35	Calculate: Line (q) +60 sec	sec		( )				(av)
35	Convert Line (av) to VDW reading using calibration chart	deg min						(aw)

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 13

JDC NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Record AGC display * and TRUNNION CDU 45° (+60")	CDU TRN ° R2 deg bits						(ax)
		CDU TRN ° R2 deg bits						
		CDU TRN ° R2 deg bits						
39	Select bit count 45° (+60")	bits						(ay)
39	CDU TRN 45° (+60")	deg						(az)
41	Calculate: Line (t) +00006 bits	bits		( )				(bc)
41	Calculate: Line (ay) - Line (bc) G & N Accuracy BITS 45° (+60")	bits	-2	( )	+2			(bd)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 13

JDC NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
41	Calculate: Line (u) +00.033 deg	deg		( )				(be)
41	Calculate: Line (az) - Line (be) G & N Accuracy CDU 45° (+60")	deg		( )				(bf)
41	Calculate: Line (q) - 30 sec	sec		( )				(bg)
41	Convert Line (bg) to VDW reading using calibration chart	deg min						(bh)
44	Record AGC display * and TRUNNION CDU 45° (-30")	CDU TRN ° R2 deg bits						(bk)
		CDU TRN ° R2 deg bits						
		CDU TRN ° R2 deg bits						
45	Select bit count 45° (-30")	bits						(bl)
45	CDU TRN 45° (-30")	deg						(bm)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 13

JDC
NO. 10043
REV. [illegible]

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
47	Calculate: Line (t) -00003 bits	bits	▨	( ) ____	▨	▨	▨	(bp)
47	Calculate: Line (bl) - Line (bp) G & N Accuracy BITS 45° (-30")	bits	-2	( ) ____	+2			(bq)
47	Calculate: Line (u) -00.017 deg	deg	▨	( ) ____	▨	▨	▨	(br)
47	Calculate: Line (bm) -Line (br) G & N Accuracy CDU 45° (-30")	deg	▨	( ) ____	▨	▨	▨	(bs)
47	Calculate: Line (q) -90 sec	sec	▨	( ) ____	▨	▨	▨	(bt)
47	Convert Line (bt) to VDW reading using calibration chart	deg min	▨	____ ____	▨	▨	▨	(bu)
			▨		▨	▨	▨	

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 13

JDC
NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
50	Record AGC display * and TRUNNION CDU 45° (-90")	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ____	▨	▨	▨	(bv)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ____	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ____	▨	▨	▨	
51	Select bit count 45° (-90")	bits	▨	____	▨	▨	▨	(bw)
51	CDU TRN 45° (-90")	deg	▨	__ __ . __ __ __	▨	▨	▨	(bx)
53	Calculate: Line (t) -00009 bits	bits	▨	( ) ____	▨	▨	▨	(ca)
53	Calculate: Line (bw) - Line (ca) G & N Accuracy BITS 45° (-90")	bits	-2	( ) ____	+2			(cb)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 13

JDC
NO. 10043
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
53	Calculate: Line (u) -00.050 deg	deg	▨	( ) ____	▨	▨	▨	(cc)
53	Calculate: Line (bx) - Line (cc) G & N Accuracy CDU 45° (-90")	deg	▨	( ) ____	▨	▨	▨	(cd)
53	Calculate: Line (q) -60 sec	sec	▨	( ) ____	▨	▨	▨	(ce)
53	Convert Line (ce) to VDW reading using calibration chart	deg min	▨	____ ____	▨	▨	▨	(cf)
56	Record AGC display * and TRUNNION CDU 45° (-60")	CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ____	▨	▨	▨	(cg)
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ____	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	__ __ . __ __ __ __ __ . __ __ __ ____	▨	▨	▨	
57	Select bit count 45° (-60")	bits	▨	____	▨	▨	▨	(ch)
57	CDU TRN 45° (-60")	deg	▨	__ __ . __ __ __	▨	▨	▨	(ck)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	Calculate: Line (t) -00006 bits	bits	▨	( ) ____	▨	▨	▨	(cn)
59	Calculate: Line (ch) - Line (cn) G & N Accuracy BITS 45° (-60")	bits	-2	( ) ____	+2			(co)
59	Calculate: Line (u) -00.033 deg	deg	▨	( ) ____	▨	▨	▨	(cp)
59	Calculate: Line (ck) - Line (cp) G & N Accuracy CDU 45° (-60")	deg	▨	( ) ____	▨	▨	▨	(cq)
68	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cr)
69	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cs)
64 67	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(ct)
73	AGC DSKY indication	R_1 deg R_2 deg	▨	____ ____	▨	▨	▨	(cu)
80	TRUN DAC slew	sec	0	____	14.0			(cv)
83	Shaft DAC slew	sec	0	____	8.0			(cw)
85	AGC DSKY indication	R_1 deg R_2 deg	▨	____ ____	▨	▨	▨	(cx)

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JDC
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JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
47	Calculate: Line (t) -00003 bits	bits		( ) ____				(bp)
47	Calculate: Line (bl) - Line (bp) G & N Accuracy BITS 45° (-30")	bits	-2	( ) ____	+2			(bq)
47	Calculate: Line (u) -00.017 deg	deg		( ) ____				(br)
47	Calculate: Line (bm) -Line (br) G & N Accuracy CDU 45° (-30")	deg		( ) ____				(bs)
47	Calculate: Line (q) -90 sec	sec		( ) ____				(bt)
47	Convert Line (bt) to VDW reading using calibration chart	deg min		____ ____				(bu)

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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
50	Record AGC display * and TRUNNION CDU 45° (-90")	CDU TRN ° R2 deg bits		__ . ___ __ __ . ___ __ ____				(bv)
		CDU TRN ° R2 deg bits		__ . ___ __ __ . ___ __ ____				
		CDU TRN ° R2 deg bits		__ . ___ __ __ . ___ __ ____				
51	Select bit count 45° (-90")	bits		____				(bw)
51	CDU TRN 45° (-90")	deg		__ . ___ __				(bx)
53	Calculate: Line (t) -00009 bits	bits		( ) ____				(ca)
53	Calculate: Line (bw) - Line (ca) G & N Accuracy BITS 45° (-90")	bits	-2	( ) ____	+2			(cb)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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JDC
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JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
53	Calculate: Line (u) -00.050 deg	deg		( ) ____				(cc)
53	Calculate: Line (bx) - Line (cc) G & N Accuracy CDU 45° (-90")	deg		( ) ____				(cd)
53	Calculate: Line (q) -60 sec	sec		( ) ____				(ce)
53	Convert Line (ce) to VDW reading using calibration chart	deg min		____ ____				(cf)
56	Record AGC display * and TRUNNION CDU 45° (-60")	CDU TRN ° R2 deg bits		__ . ___ __ __ . ___ __ ____				(cg)
		CDU TRN ° R2 deg bits		__ . ___ __ __ . ___ __ ____				
		CDU TRN ° R2 deg bits		__ . ___ __ __ . ___ __ ____				
57	Select bit count 45° (-60")	bits		____				(ch)
57	CDU TRN 45° (-60")	deg		__ . ___ __				(ck)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

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JDC
NO. 10043
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JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	Calculate: Line (t) -00006 bits	bits		( ) ____				(cn)
59	Calculate: Line (ch) - Line (cn) G & N Accuracy BITS 45° (-60")	bits	-2	( ) ____	+2			(co)
59	Calculate: Line (u) -00.033 deg	deg		( ) ____				(cp)
59	Calculate: Line (ck) - Line (cp) G & N Accuracy CDU 45° (-60")	deg		( ) ____				(cq)
68	SCT (OFFSET 25°)			Reacted as Specified				(cr)
69	SCT Comparison (Offset 0°)			Reacted as Specified				(cs)
64 67	IMAGE RESOLUTION			Clear and Distinct				(ct)
73	AGC DSKY indication	R_1 deg R_2 deg		____ ____				(cu)
80	TRUN DAC slew	sec	0	____	14.0			(cv)
83	Shaft DAC slew	sec	0	____	8.0			(cw)
85	AGC DSKY indication	R_1 deg R_2 deg		____ ____				(cx)

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JDC
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JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
86	Calculate: Line (cx) R_1 - Line (cu) R_1 (SHAFT)	deg	-.022	( ) ________	+.022			(cy)
86	Calculate: Line (cx) R_2 - Line (cu) R_2 (TRUNNION)	deg	-0.01	( ) ________	+.01			(cz)
87	SXT shaft MDA input	mv	0	________	100			(da)
87	SXT trunnion MDA input	mv	0	________	100			(db)
93	SCT TRUNNION Counter	deg	24.66	( ) ________	25.34			(dc)
93	SCT SHAFT Counter	deg	179.92	( ) ________	180.08			(dd)
96	(SCT) TRUNNION R2 DSKY indication	deg	24.8	________	25.2			(de)

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NO. 10043
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JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
86	Calculate: Line (cx) R_1 - Line (cu) R_1 (SHAFT)	deg	-.022	( )________	+.022			(cy)
86	Calculate: Line (cx) R_2 - Line (cu) R_2 (TRUNNION)	deg	-0.01	( )________	+.01			(cz)
87	SXT shaft MDA input	mv	0	________	100			(da)
87	SXT trunnion MDA input	mv	0	________	100			(db)
93	SCT TRUNNION Counter	deg	24.66	( )________	25.34			(dc)
93	SCT SHAFT Counter	deg	179.92	( )________	180.08			(dd)
96	(SCT) TRUNNION R2 DSKY indication	deg	24.8	________	25.2			(de)

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JOB OPTICS POSITIONAL ACCURACY TEST

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INITIAL TDRR ________ **D.S. PGS** 13

SUBSYSTEM G&N SYSTEM

ASSY.

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and SXT slew characteristics in the COMPUTER mode are checked in this test.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1026000

IMPORTANT See Below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000 and Data Sheets 10043, and 10003.

IMPORTANT: Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

Data from JDC 10003 must be made available before proceeding with this JDC.

NOTE: The G&N Mounting Fixture shall be set at 0.0° position.

1. Insure that the SLAVE TELESCOPE switch on the G&N indicator control panel is set to STAR LOS and that the TRACK light and the TRACKER POWER switch are OFF.

2. Set the CONTROLLER MODE switch on the G&N Indicator Control Panel to DIRECT and the CONTROLLER SPEED switch to HI.

3. Set the OPTICS MODE switch on the G&N indicator control panel to ZERO OPTICS and after one minute, record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet. Set OPTICS MODE switch to MANUAL.

4. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust the G&N MOUNTING FIXTURE until the horizontal reticle line of the SXT is coincident with dot and horizontal reticle line of target #1.

5. Pushing the control stick to the right, drive the SXT until the SHAFT ANGLE CDU indicates 270.000°. Set the CONTROLLER

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

SPEED switch on the G&N indicator control panel to LO and manipulate the control stick to fine position the SXT until the SHAFT ANGLE CDU reads 270.000 and the 2X TRUNNION CDU reads the value recorded in step 3 line (a).

6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central verticle reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.

7. Cover SXT LLOS and repeat step 6 for SXT StLOS while maintaining 2X TRUNNION CDU reading of step 3 line (a) by manipulating control stick. Record VDW reading in line (e) of Data Sheet.

8. Complete lines (d) (f) and (g) of Data Sheet.

9. Sight through SCT eyepiece and manipulate the control stick until central dot on reticle of target #2 is aligned between crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet.
Record TRUNNION ANGLE, indicated on Optics Head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set OPTICS MODE switch on G&N indicator control panel to ZERO OPTICS. Wait one minute before proceeding.

12. Enter (and verify) VERB 16, NOUN 55 into G&N AGC DSKY. Press ENTER pushbutton. The AGC Display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeroes.) Set OPTICS MODE switch to MANUAL.

13. Complete lines (p) (q) and (r) of Data Sheet. Set the CONTROLLER SPEED switch to HI.

14. Repeat step 5.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS and insure that the SXT vertical reticle line and target #1 reticle dot (or verticle reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set the CONTROLLER SPEED switch on the G&N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.000°. Return the CONTROLLER SPEED switch to LO.

19. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 approaches the verticle crosshair on the SXT reticle.

DATE ______

At the instant of coincidence, simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel.

NOTE: VERB 06, NOUN 56 shall appear on G & N AGC DSKY indicating optical CDU and time displays.

20. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (s) of Data Sheet. Release thumbwheel. Repeat step 19 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

21. Observe the three bit counts of line (s) of Data Sheet. If two of the three counts are equal, record this count in line (t). If all three counts are different, record the count which falls between the smallest and the largest on line (t).

22. Record the TRUNNION CDU value from line (s) which corresponds to line (t) in line (u).

23. Complete lines (x) and (y) of Data Sheet.

24. Set VDW to value recorded in line (y) of Data Sheet.

25. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 approaches the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

26. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (z) of Data Sheet. Release thumbwheel. Repeat step 25 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

27. Observe the three bit counts of line (z) of Data Sheet. If two of the three counts are equal, record this count in line (aa). If all three counts are different, record the count which falls between the smallest and the largest in line (aa).

28. Record the TRUNNION CDU value from line (z) which corresponds to line (aa) in line (ab).

29. Complete lines (ae), (af), (ag), (ah), (ak), and (al) of Data Sheet.

30. Set VDW to value recorded in line (al) of Data Sheet.

31. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the verticle crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

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32. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (am) of Data Sheet. Release thumbwheel. Repeat step 31 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

33. Observe the three bit counts of line (am) of Data Sheet. If two of the three counts are equal, record this count in line (an). If all three counts are different, record the count which falls between the smallest and the largest in line (an).

34. Record TRUNNION CDU value from line (am) which corresponds to line (an) in line (ao).

35. Complete lines (ar), (as), (at), (au), (av) and (aw) of Data Sheet.

36. Set VDW to value recorded in line (aw) of Data Sheet.

37. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

38. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (ax) of Data Sheet. Release thumbwheel. Repeat step 37 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

39. Observe the three bit counts of line (ax) of Data Sheet. If two of the three counts are equal, record this count in line (ay). If all three counts are different, record the count which falls between the smallest and the largest in line (ay).

40. Record the TRUNNION CDU value from line (ax) which corresponds to line (ay) in line (az).

41. Complete lines (bc), (bd), (be), (bf), (bg), and (bh) of Data Sheet.

42. Set VDW to value recorded in line (bh) of Data Sheet.

43. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

44. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bk) of Data Sheet. Release thumbwheel. Repeat step 43 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

DATE ______

45. Observe the three bit counts of line (bk) of Data Sheet. If two of the three counts are equal, record this count in line (bl). If all three counts are different, record the count which falls between the smallest and the largest in line (bl).

46. Record the TRUNNION CDU value from line (bk) which corresponds to line (bl) in line (bm).

47. Complete lines (bp), (bq), (br), (bs), (bt), and (bu) of Data Sheet.

48. Set VDW to value recorded in line (bu) of Data Sheet.

49. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

50. Record G & N AGC DSKY R2 indication and TRUNNION CDU in line (bv) of Data Sheet. Repeat step 49 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

51. Observe the three bit counts of line (bv) of Data Sheet. If two of the three counts are equal, record this count in line (bw). If all three counts are different, record the count which falls between the smallest and the largest in line (bw).

52. Record the TRUNNION CDU value from line (bv) which corresponds to line (bw) in line (bx).

53. Complete lines (ca), (cb), (cc), (cd), (ce) and (cf) of Data Sheet.

54. Set VDW to value recorded in line (cf) of Data Sheet.

55. Manipulate the control stick vertically to position the SXT StLOS until central dot on reticle of target #3 is approaching the vertical crosshair on the SXT reticle. Simultaneously press MARK pushbutton and stop and hold TRUNNION CDU thumbwheel at the instant of coincidence.

56. Record G & N AGC DSKY R2 indication, and TRUNNION CDU in line (cg) of Data Sheet. Repeat step 55 two more times, recording the DSKY R2 indication and TRUNNION CDU for each MARK.

57. Observe the three bit counts of line (cg) of Data Sheet. If two of the three counts are equal, record this count in line (ch). If all three counts are different, record the count which falls between the smallest and the largest in line (ch).

DATE ________

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58. Record the TRUNNION CDU value from line (cg) which corresponds to line (ch) in line (ck).

59. Complete lines (cm), (co), (cp), and (cq) of Data Sheet.

60. Set OPTICS MODE switch on G&N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes out, return switch to MANUAL.

61. Set the CONTROLLER SPEED switch on the G&N indicator control panel to HI and using the control stick, drive the SXT until the SHAFT ANGLE CDU indicates 270. Return the CONTROLLER SPEED switch to LO and manipulate the control stick to fine position the SXT until the SHAFT ANGLE CDU indicates 270.000 .

62. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G&N Mounting Fixture cradle.

63. Sight through the SXT StLOS and, using the control stick, position the approximate center of the SXT StLOS reticle pattern to the number 10 resolution pattern of target #1.

64. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

65. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

66. Sight through the SCT LOS and, using the control stick, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

67. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

68. Set SLAVE TELESCOPE switch on G&N indicator control panel to OFF-SET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT reticle pattern.

69. Set SLAVE TELESCOPE switch on G&N indicator control panel to LANDMARK LOS 0 . The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

70. Set SLAVE TELESCOPE switch on G&N indicator control panel to STAR LOS.

71. Set OPTICS MODE switch on G&N indicator control panel to ZERO OPTICS and, after ZERO ENCODER Light is out, return switch to MANUAL.

72. Set the CONTROLLER SPEED switch on the G&N indicator control panel to HI and using the control stick, drive the SXT until the 2X TRUNNION CDU reads 90.00 and the SHAFT ANGLE CDU reads 270.00 . (Do not drive through 180.000). Return the CONTROLLER SPEED switch to LO and while sighting through the SXT eyepiece, use the control stick to drive the StLOS until the center of the SXT reticle pattern approaches the reticle dot of target #3. At the instant of coincidence press MARK pushbutton.

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73. Record indications of rows 1 and 2 of G&N AGC DSKY as R1 and R2, respectively in line (cu) of Data Sheet.

74. Monitor TRUNNION CDU unconditioned square wave - 8 on PSA Adapter at 45A7J1 pins 6 (Hihg) and 13 (Low) using pulse proble.

75. Set the following controls on PRIMARY SIGNAL SELECTOR PANEL:

COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton - "D" PULSE indicator lighted
DIGITAL RECORDER SELECTOR to CTR.

Set the following controls on COUNTER:

SAMPLE TIME (N_1) to 002548
CLOCK FREQUENCY DIVIDER to 10
DISPLAY RESET to ZERO
CLOCK SELECTOR to INT
FUNCTION to Ratio or Period
INPUT SELECTOR to C SENSE
SENSE SELECTOR to FWD
ATTEN D to 10 AC
SLOPE to +
TRIGGER VOLTAGE- As required.

77. Enter VERB 36 into G&N AGC DSKY. Press ENTER pushbutton. Enter VERB 21, NOUN 01, press ENTER pushbutton. Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

78. Set the OPTICS MODE switch on G&N indicator control panel to COMPUTER.

79. Enter (and verify) VERB 41, NOUN 55 into G&N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

80. Enter +00000 into row 1 of G&N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G&N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

81. Monitor SHAFT CDU unconditioned square wave - on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe, Set SAMPLE TIME (N_1) on COUNTER to 002913.

82. Enter (and verify) VERB 41, NOUN 55 into G&N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

83. Enter R1 from step 74 into G&N AGC DSKY. Press ENTER pushbutton. Enter R2 from step 74 into G&N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

84. Enter (and verify) VERB 16, NOUN 55 into G&N AGC DSKY. Press ENTER pushbutton.

85. Sight through SXT eyepiece. The center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G&N AGC DSKY as R1 and R2, respectively, in line (cx) of Data Sheet.

86. Perform calculations (cy) and (cz) on Data Sheet.

DATE ________

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87. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use AC probes to measure the following in-phase signals on the PAVM:

a. SXT shaft MDA input at 45A8J1 pins 9 (high) and 23 (low)
b. SXT trunnion MDA input at 45 A8J1 pins 2 (high) and 1 (low)

Record indications in lines (da) and (db) of Data Sheet.

88. Adjust G&N MOUNTING FIXTURE to approximately 25 .

89. Set OPTICS MODE switch on G&N indicator control panel to ZERO OPTICS and, after ZERO ENCODER light goes out return switch to COMPUTER.

90. Enter VERB 21, NOUN 01 into G&N AGC DSKY. Press ENTER pushbutton. Enter address 00744, press ENTER pushbutton. Enter 40000, press ENTER pushbutton.

91. Enter (and verify) VERB 41, NOUN 55 into G&N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

92. Enter +18000 into row 1 of G&N AGC DSKY. Press ENTER pushbutton. Enter +25000 into row 2 of G&N AGC DSKY. Press ENTER pushbutton.

93. Record the Telescope Panel Angle Counter shaft and trunnion indications on the data sheet.

94. Sight through SXT eyepiece and insure that horizontal reticle line of SXT is coincident with horizontal reticle line of target #1 by adjusting G&N Mounting Fixture cradle.

95. Set the OPTICS MODE switch on G&N indicator control panel to MANUAL. Set the CONTROLLER SPEED switch to LO.

96. Sight through the SCT 1X eyepiece and manipulate the control stick vertically to position the SCT LOS until central horizontal reticle line of SCT approaches the central dot on the reticle of target #2. At the instant of coincidence press MARK pushbutton. Record indication of R2 of G&N AGC DSKY.

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 13

JDC
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INITIAL TDRR ____

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ ____ CAL DATE
NAME ____ SER. NO. ____ ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
3	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ____	+0.006			(a)
3	Record SHAFT CDU indication	deg	-0.006	( ) ____	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min		____ ____				(c)
8	Convert Line (c) to sec. using Calibration Chart	Sec		( ) ____				(d)
6	Record VDW Reading of WSTLOS	Deg Min		____ ____				(e)
8	Convert Line (e) to sec. using calibration chart	sec		( ) ____				(f)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

DATE ____

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 13

JDC
NO. 10043
REV. -

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
8	Calculate: Line (f) - Line (d) StLOS-LLOS parallelism	sec	-10	( ) ____	10			(g)
9	Record 2X TRUNNION CDU indication	deg		( ) ____				(h)
9	Record TRUNNION ANGLE indication TRN	deg		( ) ____				(k)
10	Calculate: Line (h) - Line (a) SCT-SXT parallelism	deg	-0.2	( ) ____	+0.2			(m)
Imp	Transfer target calibration angle ϕ_2 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec		____ ____ ____				(n)
13	Calculate: Line 45° - (n) to nearest second	Sec		( ) ____				(p)
13	Calculate: Line (p) + Line (d)	Sec		( ) ____				(q)

DATE ____

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 13

JDC
NO. 10043
REV. -

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
13	Convert Line (q) to VDW reading using calibration chart **	Deg Min		____ ____				(r)
20	Record AGC display * and TRUNNION CDU 45°	CDU TRN ° R2 deg bits		— —. — — — — —. — — — ____				(s)
		CDU TRN ° R2 deg bits		— —. — — — — —. — — — ____				
		CDU TRN ° R2 deg bits		— —. — — — — —. — — — ____				
21	Select bit count 45°	bits	16382	____	16386			(t)
21	CDU TRN 45°	deg		— —. — — —				(u)
23	Calculate: Line (q) + 90 sec	sec		( ) ____				(x)
23	Convert Line (x) to VDW reading using calibration chart	deg min		____ ____				(y)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

** If Line (q) is - , add calibration chart indication to 0°0'.
If Line (q) is +, subtract calibration chart indication from 359° 60'.

DATE ____

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 13

JDC
NO. 10043
REV. -

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
26	Record AGC display * and TRUNNION CDU 45° (+ 90")	CDU TRN ° R2 deg bits		— —. — — — — —. — — — ____				(z)
		CDU TRN ° R2 deg bits		— —. — — — — —. — — — ____				
		CDU TRN ° R2 deg bits		— —. — — — — —. — — — ____				
27	Select bit count 45° (+ 90")	bits		____				(aa)
27	CDU TRN 45° (+ 90")	deg		— —. — — —				(ab)
29	Calculate: Line (t) + 00009 bits	bits		( ) ____				(ae)
29	Calculate: Line (aa) - Line (ae) G & N Accuracy BITS 45° (+ 90")	bits	-2	( ) ____	+2			(af)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 13

JDC
NO. 10043
REV. -

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Calculate: Line (u) +00.050 deg	deg		( )				(ag)
29	Calculate: Line (ab) - Line (ag) G & N Accuracy CDU 45° (+90")	deg		( )				(ah)
29	Calculate: Line (q) + 30 sec	sec		( )				(ak)
29	Convert Line (ak) to VDW reading using calibration chart	deg min						(al)
32	Record AGC display * and TRUNNION CDU 45° (+30")	CDU TRN ° R2 deg bits CDU TRN ° R2 deg bits CDU TRN ° R2 deg bits						(am)
33	Select bit count 45° (+30")	bits						(an)
33	CDU TRN 45° (+30")	deg						(ao)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 13

JDC
NO. 10043
REV. -

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
35	Calculate: Line (t) +00003 bits	bits		( )				(ar)
35	Calculate: Line (an) - Line (ar) G & N Accuracy BITS 45° (+30")	bits	-2	( )	+2			(as)
35	Calculate: Line (u) +00.017 deg	deg		( )				(at)
35	Calculate: Line (ao) - Line (at) G & N Accuracy CDU 45° (+30")	deg		( )				(au)
35	Calculate: Line (q) +60 sec	sec		( )				(av)
35	Convert Line (av) to VDW reading using calibration chart	deg min						(aw)

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 13

JDC
NO. 10043
REV. -

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Record AGC display * and TRUNNION CDU 45° (+60")	CDU TRN ° R2 deg bits CDU TRN ° R2 deg bits CDU TRN ° R2 deg bits						(ax)
39	Select bit count 45° (+60")	bits						(ay)
39	CDU TRN 45° (+60")	deg						(az)
41	Calculate: Line (t) +00006 bits	bits		( )				(bc)
41	Calculate: Line (ay) - Line (bc) G & N Accuracy BITS 45° (+60")	bits	-2	( )	+2			(bd)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 13

JDC
NO. 10043
REV. -

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
41	Calculate: Line (u) +00.033 deg	deg		( )				(be)
41	Calculate: Line (az) - Line (be) G & N Accuracy CDU 45° (+60")	deg		( )				(bf)
41	Calculate: Line (q) - 30 sec	sec		( )				(bg)
41	Convert Line (bg) to VDW reading using calibration chart	deg min						(bh)
44	Record AGC display * and TRUNNION CDU 45° (-30")	CDU TRN ° R2 deg bits CDU TRN ° R2 deg bits CDU TRN ° R2 deg bits						(bk)
45	Select bit count 45° (-30")	bits						(bl)
45	CDU TRN 45° (-30")	deg						(bm)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 OF 13

JDC
NO. 10043
REV. -

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
47	Calculate: Line (t) -00003 bits	bits	▨	( ) ____	▨	▨	▨	(bp)
47	Calculate: Line (bl) - Line (bp) G & N Accuracy BITS 45° (-30")	bits	-2	( ) ____	+2			(bq)
47	Calculate: Line (u) -00.017 deg	deg	▨	( ) ____	▨	▨	▨	(br)
47	Calculate: Line (bm) -Line (br) G & N Accuracy CDU 45° (-30")	deg	▨	( ) ____	▨	▨	▨	(bs)
47	Calculate: Line (q) -90 sec	sec	▨	( ) ____	▨	▨	▨	(bt)
47	Convert Line (bt) to VDW reading using calibration chart	deg min	▨	____ ____	▨	▨	▨	(bu)
			▨		▨	▨	▨	

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 OF 13

JDC
NO. 10043
REV. -

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
50	Record AGC display * and TRUNNION CDU 45° (-90")	CDU TRN ° R2 deg bits	▨	____ ____ ____	▨	▨	▨	(bv)
		CDU TRN ° R2 deg bits	▨	____ ____ ____	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	____ ____ ____	▨	▨	▨	
51	Select bit count 45° (-90")	bits	▨	____	▨	▨	▨	(bw)
51	CDU TRN 45° (-90")	deg	▨	____	▨	▨	▨	(bx)
53	Calculate: Line (t) -00009 bits	bits	▨	( ) ____	▨	▨	▨	(ca)
53	Calculate: Line (bw) - Line (ca) G & N Accuracy BITS 45° (-90")	bits	-2	( ) ____	+2			(cb)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 OF 13

JDC
NO. 10043
REV. -

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
53	Calculate: Line (u) -00.050 deg	deg	▨	( ) ____	▨	▨	▨	(cc)
53	Calculate: Line (bx) - Line (cc) G & N Accuracy CDU 45° (-90")	deg	▨	( ) ____	▨	▨	▨	(cd)
53	Calculate: Line (q) -60 sec	sec	▨	( ) ____	▨	▨	▨	(ce)
53	Convert Line (ce) to VDW reading using calibration chart	deg min	▨	____ ____	▨	▨	▨	(cf)
56	Record AGC display * and TRUNNION CDU 45° (-60")	CDU TRN ° R2 deg bits	▨	____ ____ ____	▨	▨	▨	(cg)
		CDU TRN ° R2 deg bits	▨	____ ____ ____	▨	▨	▨	
		CDU TRN ° R2 deg bits	▨	____ ____ ____	▨	▨	▨	
57	Select bit count 45° (-60")	bits	▨	____	▨	▨	▨	(ch)
57	CDU TRN 45° (-60")	deg	▨	____	▨	▨	▨	(ck)

* Multiply AGC DSKY R2 x 364.09 to convert to bits.

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 OF 13

JDC
NO. 00043
REV. -

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	Calculate: Line (t) -00006 bits	bits	▨	( ) ____	▨	▨	▨	(cn)
59	Calculate: Line (ch) - Line (cn) G & N Accuracy BITS 45° (-60")	bits	-2	( ) ____	+2			(co)
59	Calculate: Line (u) -00.033 deg	deg	▨	( ) ____	▨	▨	▨	(cp)
59	Calculate: Line (ck) - Line (cp) G & N Accuracy CDU 45° (-60")	deg	▨	( ) ____	▨	▨	▨	(cq)
68	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cr)
69	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cs)
64 67	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(ct)
73	AGC DSKY indication	R_1 deg R_2 deg	▨	____ ____	▨	▨	▨	(cu)
80	TRUN DAC slew	sec	0	____	14.0			(cv)
83	Shaft DAC slew	sec	0	____	8.0			(cw)
85	AGC DSKY indication	R_1 deg R_2 deg	▨	____ ____	▨	▨	▨	(cx)

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 OF 13

JDC
NO. 10043
REV. -

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
86	Calculate: Line (cx) R_1 - Line (cu) R_1 (SHAFT)	deg	-.022	( ) ______	+.022			(cy)
86	Calculate: Line (cx) R_2 - Line (cu) R_2 (TRUNNION)	deg	-.005	( ) ______	+.005			(cz)
87	SXT shaft MDA input	mv	0	______	100			(da)
87	SXT trunnion MDA input	mv	0	______	100			(db)
93	SCT TRUNNION Counter	deg	24.85	( ) ______	25.15			(dc)
93	SCT SHAFT Counter	deg	179.92	( ) ______	180.08			(dd)
94	(SCT) TRUNNION R2 DSKY indication	deg	24.8	______	25.2			(de)

DATE ______

JOB OPTICS POSITIONAL ACCURACY TEST | JDC 10073 REV. A PAGE 1 OF 6
INITIAL TDRR 16919 D.S. PGS 12

SUBSYSTEM G & N SYSTEM | ASSY.

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT St LOS positional accuracy, SCT and CDU DAC slew characteristics are checked in this test. In addition, comparison is made with corresponding prelog data.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5-11-65	19030	6	2, 12, 13	WK	TM

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1025500

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1025500 and Data Sheets 10073, 10609 and 10003.

IMPORTANT: Proceed with this JDC if JDC 10063 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10061, Part III before proceeding with this JDC.

Data from JDC 10003 and JDC 10609 must be transferred to lines (n) (u) (aa) (an) (ay) (bk) (bw) and (cg) of JDC 10073 Data Sheet before proceeding with this JDC.

1. Insure that the G & N MOUNTING FIXTURE is at a tilt angle of zero degrees and that the OPTICS HOLD switch is set to ON.

2. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL. Record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.

3. Set OPTICS HOLD switch to OFF and using the control stick and SHAFT ANGLE CDU thumbwheel, drive the SHAFT ANGLE CDU until the CDU indicates 270°. Set OPTICS HOLD switch to ON.

4. Set the SHAFT ANGLE CDU to 270.000° and the 2X TRUNNION CDU to the angle recorded in step 2a using CDU thumbwheel.

5. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust G & N MOUNTING FIXTURE until horizontal reticle line of SXT is coincident with dot and horizontal reticle line of target #1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB OPTICS POSITIONAL ACCURACY TEST | JDC 10073 REV A PAGE 2 OF 6

SUBSYSTEM G & N SYSTEM | ASSY

6. Cover SXT St LOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover St LOS.

7. Cover SXT LLOS and repeat step 6 for SXT St LOS recording VDW reading in line (e) of Data Sheet.

8. Complete lines (d) (f) and (g) of Data Sheet.

9. Sight through SCT 1X eyepiece and adjust 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels until central dot on reticle of target #2 is aligned between crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL.

12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeros).

13. Complete lines (p) (q) and (r) of Data Sheet.

14. Place the Variable Deviation Wedge in front of target #1 and repeat steps 3 and 4.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set OPTICS HOLD switch to OFF and using control stick, drive 2X TRUNNION CDU to 90°. Set OPTICS HOLD switch to ON.

19. Using 2X TRUNNION CDU thumbwheel, position SXT St LOS until central dot on reticle of target #3 is aligned to the vertical crosshair on the SXT reticle.

20. Record 2X TRUNNION CDU and AGC display indications in lines (s) and (t) of Data Sheet. Complete lines (w) and (x) of Data Sheet.

21. Set VDW to value recorded in line (x) of Data Sheet.

22. Repeat step 19.

23. Record 2X TRUNNION CDU and AGC display indications in lines (y) and (z) of Data Sheet. Complete lines (ag) and (ah) of Data Sheet.

24. Set VDW to value recorded in line (ah) of Data Sheet.

DATE ______

JOB OPTICS POSITIONAL ACCURACY TEST | JDC 10073 REV A PAGE 3 OF 6

SUBSYSTEM G & N SYSTEM | ASSY

25. Repeat step 19.

26. Record 2X TRUNNION CDU and AGC display indications in lines (ak) and (am) of Data Sheet. Complete lines (au) and (av) of Data Sheet.

27. Set VDW to value recorded in line (av) of Data Sheet.

28. Repeat step 19.

29. Record 2X TRUNNION CDU and AGC display indications in lines (aw) and (ax) of Data Sheet. Complete lines (be) and (bf) of Data Sheet.

30. Set VDW to value recorded in line (bf) of Data Sheet.

31. Repeat step 19.

32. Record 2X TRUNNION CDU and AGC display indications in lines (bg) and (bh) of Data Sheet. Complete lines (bs) and (bt) of Data Sheet.

33. Set VDW to value recorded in line (bt) of Data Sheet.

34. Repeat step 19.

35. Record 2X TRUNNION CDU and AGC display indications in lines (bu) and (bv) of Data Sheet. Complete lines (cc) and (cd) of Data Sheet.

36. Set VDW to value recorded in line (cd) of Data Sheet.

37. Repeat step 19.

38. Record 2X TRUNNION CDU and AGC display indications in lines (ce) and (cf) of Data Sheet. Complete lines (v) (ab) (ac) (ad) (ae) (af) (ap) (aq) (ar) (as) (at) (az) (ba) (bb) (bc) (bd) (bm) (bn) (bp) (bq) (br) (bx) (by) (bz) (ca) (cb) (ch) (ck) (cm) (cn) and (cp) of Data Sheet.

39. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL.

40. Set OPTICS HOLD switch to OFF and using the control stick and SHAFT ANGLE CDU thumbwheel, drive the SHAFT ANGLE CDU until the CDU indicates 270°. Set OPTICS HOLD switch to ON.

41. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N MOUNTING FIXTURE cradle.

42. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFFSET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT reticle pattern.

43. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

44. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.

45. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to

DATE ______

JOB OPTICS POSITIONAL ACCURACY TEST | JDC 10073 REV A PAGE 4 OF 6

SUBSYSTEM G & N SYSTEM | ASSY

MANUAL.

46. Sight through the SXT St LOS and, using 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, position the approximate center of the SXT St LOS reticle pattern to the number 10 resolution pattern of target #1.

47. Sight through St LOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

48. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

49. Sight through the SCT LOS and, using the 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

50. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

51. Set Optics Hold switch on G & N indicator control panel to OFF and set to ZERO OPTICS and, after one minute, return selector to MANUAL.

52. Set the 2X TRUNNION CDU to 90.0° and the SHAFT ANGLE CDU to -90.0° (270°) (do not drive thru 180°). Set OPTICS HOLD switch to ON. Sight through SXT eyepiece and, using control stick and 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, drive the St LOS until the center of the SXT reticle pattern is coincident with the reticle dot of target #3.

53. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. Record indications of rows 1 and 2 of G & N AGC DSKY as r1 and r2, respectively, in line (ct) of Data Sheet.

54. Monitor TRUN CDU $-\Delta\theta$ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

55. Set following controls on PRIMARY SIGNAL SELECTOR panel:
   - COUNTER INPUT "D" PULSE to 13
   - D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
   - DIGITAL RECORDER SELECTOR to CTR.

56. Set following controls on COUNTER:
   - SAMPLE TIME (N_1) to 002548
   - CLOCK FREQUENCY DIVIDER to 10
   - DISPLAY RESET to ZERO
   - CLOCK SELECTOR to INT
   - FUNCTION to Ratio or Period
   - INPUT SELECTOR to C SENSE
   - SENSE SELECTOR to FWD
   - ATTEN D to 10 AC
   - SLOPE to +
   - TRIGGER VOLTAGE - As required

57. Set OPTICS HOLD switch to OFF and set the optics mode selector on G & N indi-

DATE ______

SUBSYSTEM G & N SYSTEM | **ASSY**

cator control panel to COMPUTER.

58. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

59. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

60. Monitor SHAFT CDU $-\Delta\theta$ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N_1) on COUNTER to 002913.

61. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

62. Enter r 1 from step 53 into G & N AGC DSKY. Press ENTER pushbutton. Enter r 2 from step 53 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder. Set OPTICS HOLD switch to ON.

63. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

64. Sight through SXT eyepiece, the center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as r 1 and r 2, respectively, in line (cw) of Data Sheet.

65. Perform calculations (cx) and (cy) on Data Sheet.

66. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in-phase signals on the PAVM:

   a. Shaft CDU DAC Error at 45A8J1 pins 34 (high) and 33 (low)
   b. Trunnion CDU DAC Error at 45A8J1 pins 26 (high) and 25 (low)

Record indications in lines (cz) and (da) of Data Sheet.

67. Adjust G & N MOUNTING FIXTURE to approximately 25°.

68. Set OPTICS HOLD switch on G & N indicator control panel to OFF and optics mode selector to ZERO OPTICS and, after one minute, return selector to MANUAL.

69. Using control stick and thumbwheel, drive 2X TRUNNION CDU to 50.000° (±0.10°) and SHAFT ANGLE CDU to 180.000° (±0.10°). Set OPTICS HOLD switch to ON.

70. Sight through SXT eyepiece and insure that horizontal reticle of SXT is coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle,

71. Sight through the SXT eyepiece and, using the 2X TRUNNION CDU thumbwheel,

DATE ________

SUBSYSTEM G & N SYSTEM | **ASSY**

position the SXT StLOS until central dot on reticle of target #1 is coincident with central horizontal reticle line of SXT.

72. Record indication of SCT TRUNNION counter and SHAFT counter as (db) and (dc) on Data Sheet.

73. Sight through the SCT 1X eyepiece and, using the 2X TRUNNION CDU thumbwheel, position the SCT LOS until central dot on reticle of target #2 is coincident with central horizontal reticle line of SCT. Record 2X TRUNNION CDU indication in line (de) of Data Sheet.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 12

JDC NO. 10073
REV. A
INITIAL TDRR 16919

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST

TITLE G & N SYSTEM

SER. NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION

TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________________ SER. NO. ______ ______ CAL DATE

NAME ____________________ SER. NO. ______ ______ CAL DATE

CONDUCTED BY ____________ NAME/AFFILIATION APPROVED BY ____________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
2	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ________	+0.006			(a)
2	Record SHAFT CDU indication	deg	-0.006	( ) ________	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min	▨	________ ________	▨	▨	▨	(c)
8	Convert Line (c) to sec. using Calibration Chart	Sec	▨	( ) ________	▨	▨	▨	(d)
6	Record VDW Reading of WSTLOS	Deg Min	▨	________ ________	▨	▨	▨	(e)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 12

JDC NO. 10073
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
8	Convert Line (e) to sec. using calibration chart	sec	▨	( ) ________	▨	▨	▨	(f)
8	Calculate: Line (f) - Line (d) StLOS-LLOS parallelism	sec	-10	( ) ________	10			(g)
9	Record 2X TRUNNION CDU indication CDU SCT	deg	▨	( ) ________	▨	▨	▨	(h)
9	Record TRUNNION ANGLE indication TRN	deg	▨	( ) ________	▨	▨	▨	(k)
10	Calculate: Line (h) -Line (a) SCT-SXT parallelism	deg	-0.824	( ) ________	+0.824			(m)

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 12

JDC
NO. 10073
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec		______ ______ ______				(n)
13	Calculate: Line 45° - (n) to nearest second	Sec		( ) ______				(p)
13	Calculate: Line (p) + Line (d)	Sec		( ) ______				(q)
13	Convert Line (q) to VDW Reading using calibration chart	Deg Min		______ ______				(r)
20	Record AGC display 45° *	bits R_2 deg	16382	______ __ __. __ __ __	16386			(s)
20	Record 2X TRUNNION CDU indication 45°	deg	89.990	( ) ______	90.010			(t)
Imp	Transfer Encoder from JDC 10609-B3 45° 0' 0"	bits		______				(u)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 12

JDC
NO. 10073
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (s) - Line (u) OSS G & N Comparison 45°	bits	-1	( ) ______	+1			(v)
20	Calculate: Line (q) + 90 sec	sec		( ) ______				(w)
20	Convert Line (w) to VDW Reading using calibration chart	Deg Min		______ ______				(x)
23	Record AGC display 45° (+ 90") *	bits R_2 deg		______ __ __. __ __ __				(y)
23	Record 2X TRUNNION CDU indication 45° (+ 90")	deg		( ) ______				(z)
Imp	Transfer Encoder from JDC 10609-B3 45° 01' 30"	bits		______				(aa)
38	Calculate: Line (y) - Line (aa) OSS-G&N Comparison 45° (+ 90")	bits	-1	( ) ______	+1			(ab)
38	Calculate: Line (s) + 00009 bits	bits		( ) ______				(ac)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 12

JDC
NO. 10073
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (y) - Line (ac) G & N Accuracy BITS 45° (+ 90")	bits	-1	( ) ______	+1			(ad)
38	Calculate Line (t) + 00.050 deg	deg		( ) ______				(ae)
38	Calculate: Line (z) - Line (ae) G & N Accuracy CDU 45° (+ 90")	deg	-.006	( ) ______	+.006			(af)
23	Calculate: Line (q) + 30 sec	sec		( ) ______				(ag)
23	Convert Line (ag) to VDW Reading using calibration chart	Deg Min		______ ______				(ah)
26	Record AGC display 45° (+ 30")*	bits R_2 deg		______ ______				(ak)
26	Record 2X TRUNNION CDU indication 45° (+ 30")	deg		( ) ______				(am)
Imp	Transfer Encoder Count from JDC 10609-B3 45° 0' 30"	bits		______				(an)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 12

JDC
NO. 10073
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (ak) - Line (an) OSS-G&N Comparison 45° (+ 30")	bits	-1	( ) ______	+1			(ap)
38	Calculate: Line (s) + 00003 bits	bits		( ) ______				(aq)
38	Calculate: Line (ak) - Line (aq) G & N Accuracy BITS 45° (+ 30")	bits	-1	( ) ______	+1			(ar)
38	Calculate: Line (t) + 00.017 deg	deg		( ) ______				(as)
38	Calculate: Line (am) - Line (as) G & N Accuracy CDU 45° (+ 30")	deg	-.006	( ) ______	+.006			(at)
26	Calculate: Line (q) + 60 sec	sec		( ) ______				(au)
26	Convert Line (au) to VDW Reading using calibration chart	Deg Min		______ ______				(av)
29	Record AGC display 45° (+ 60")*	bits R_2 deg		______ ______				(aw)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 12

JDC
NO. 0073
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Record 2X TRUNNION CDU indication 45° (+60")	deg	▨	( ) ________	▨	▨	▨	(ax)
Imp	Transfer Encoder Count from JDC 10109-B3 45° 01' 00"	bits	▨	________	▨	▨	▨	(ay)
38	Calculate: Line (aw) - Line (ay) OSS-G&N Comparison 45° (+60")	bits	-1	( ) ________	+1			(az)
38	Calculate: Line (s) + 00006 bits	bits	▨	( ) ________	▨	▨	▨	(ba)
38	Calculate: Line (aw) - Line (ba) G & N Accuracy BITS 45° (+60")	bits	-1	( ) ________	+1			(bb)
38	Calculate: Line (t) + 00.033 deg	deg	▨	( ) ________	▨	▨	▨	(bc)
38	Calculate: Line (ax) - Line (bc) G & N Accuracy CDU 45° (+60")	deg	-.006	( ) ________	+.006			(bd)
29	Calculate: Line (q) - 30 sec	sec	▨	( ) ________	▨	▨	▨	(be)

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 12

JDC
NO. 10073
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Convert Line (be) to VDW Reading using calibration chart	Deg Min	▨	________ ________	▨	▨	▨	(bf)
32	Record AGC display 45° (-30") *	bits R_2 deg	▨	________ ________	▨	▨	▨	(bg)
32	Record 2X TRUNNION CDU indication 45° (-30")	deg	▨	( ) ________	▨	▨	▨	(bh)
Imp	Transfer Encoder Count from JDC 10109-B3 45° 59' 30"	bits	▨	________	▨	▨	▨	(bk)
38	Calculate: Line (bg) - Line (bk) OSS- G&N Comparison 45° (-30")	bits	-1	( ) ________	+1			(bm)
38	Calculate: Line (s) -00003 bits	bits	▨	( ) ________	▨	▨	▨	(bn)
38	Calculate: Line (bg) - Line (bn) G & N Accuracy BITS 45° (-30")	bits	-1	( ) ________	+1			(bp)
38	Calculate: Line (t) -00.017 deg	deg	▨	( ) ________	▨	▨	▨	(bq)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 12

JDC
NO. 10073
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (bh) - Line (bq) G & N Accuracy CDU 45° (-30")	deg	-.006	( ) ________	+.006			(br)
32	Calculate: Line (q) - 90 sec	sec	▨	( ) ________	▨	▨	▨	(bs)
32	Convert Line (bs) to VDW Reading using calibration chart	Deg Min	▨	________ ________	▨	▨	▨	(bt)
35	Record AGC display 45° (-90")*	bits R_2 deg	▨	________ ________	▨	▨	▨	(bu)
35	Record 2X TRUNNION CDU indication 45° (-90")	deg	▨	( ) ________	▨	▨	▨	(bv)
Imp	Transfer Encoder Count from JDC 10109-B3 45° 58' 30"	bits	▨	________	▨	▨	▨	(bw)
38	Calculate: Line (bu) - Line (bw) OSS-G & NComparison 45° (-90")	bits	-1	( ) ________	+1			(bx)
38	Calculate: Line (s) -00009 bits	bits	▨	( ) ________	▨	▨	▨	(by)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 12

JDC
NO. 10073
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (bu) - Line (by) G & N Accuracy BITS 45° (-90")	bits	-1	( ) ________	+1			(bz)
38	Calculate: Line (t) -00.050 deg	deg	▨	( ) ________	▨	▨	▨	(ca)
38	Calculate: Line (bv) - Line (ca) G & N Accuracy CDU 45° (-90")	deg	-.006	( ) ________	+.006			(cb)
35	Calculate: Line (q) - 60 sec	sec	▨	( ) ________	▨	▨	▨	(cc)
35	Convert Line (cc) to VDW Reading using calibration chart	Deg Min	▨	________ ________	▨	▨	▨	(cd)
38	Record AGC display 45° (-60") *	bits R_2 deg	▨	________ ________	▨	▨	▨	(ce)
38	Record 2X TRUNNION CDU indication 45° (-60")	deg	▨	( ) ________	▨	▨	▨	(cf)
Imp	Transfer Encoder Count from JDC 10109-B3 45° 59' 00"	bits	▨	________	▨	▨	▨	(cg)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 12

JDC
NO. 10073
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (ce) - Line (cg) OSS-G&N Comparison 45° (-60")	bits	-1	( ) ______	+1			(ch)
38	Calculate: Line (s) -00006 bits	bits	▨	( ) ______	▨	▨	▨	(ck)
38	Calculate: Line (ce) - Line (ck) G & N Accuracy BITS 45° (-60")	bits	-1	( ) ______	+1			(cm)
38	Calculate: Line (t) -00.033 deg	deg	▨	( ) ______	▨	▨	▨	(cn)
38	Calculate: Line (cf) - Line (cn) G & N Accuracy CDU 45° (-60")	deg	-.006	( ) ______	+.006			(cp)
42	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cq)
43	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cr)
47 50	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(cs)
53	AGC DSKY indication	R_1 deg R_2 deg	▨	______ ______	▨	▨	▨	(ct)

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 12

JDC
NO. 10073
REV. A

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	TRUN DAC slew	sec	0	______	14.0			(cu)
62	Shaft DAC slew	sec	0	______	8.0			(cv)
64	AGC DSKY indication	R_1 deg R_2 deg	▨	______ ______	▨	▨	▨	(cw)
65	Calculate: Line (cw) R_1 - Line (ct) R_1 (SHAFT)	deg	-.02	( ) ______	+.02			(cx)
65	Calculate: Line (cw) R_2 - Line (ct) R_2 (TRUNNION)	deg	-.005	( ) ______	+.005			(cy)
66	Shaft CDU DAC error	mv	0	______	100			(cz)
66	TRUN CDU DAC error	mv	0	______	100			(da)
72	TRUN TPAC	deg	24.43		25.30			(db)
	SHAFT TPAC	deg	179.60		182.40			(dc)
73	SCT TRUNNION angle	deg	24.599		26.247			(de)

DATE ______

JOB OPTICS POSITIONAL ACCURACY TEST | **JDC** 10073 **REV.** B **PAGE** 1 **OF** 6
INITIAL TDRR 16919 **DS PGS** 12

SUBSYSTEM G & N SYSTEM | **ASSY.**

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and CDU DAC slew characteristics are checked in this test. In addition, comparison is made with corresponding prelog data.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5-11-65	19030	6	2, 12, 13	WK	TM
B	6-22-65	20268	6	3-5, 7-10	WK	TM

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1025500

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1025500 and Data Sheets 10073, 10609 and 10003.

IMPORTANT: Proceed with this JDC if JDC 10063 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10061, Part III before proceeding with this JDC.

Data from JDC 10003 and JDC 10609 must be transferred to lines (n) (u) (aa) (an) (ay) (bk) (bw) and (cg) of JDC 10073 Data Sheet before proceeding with this JDC.

1. Insure that the G & N MOUNTING FIXTURE is at a tilt angle of zero degrees and that the OPTICS HOLD switch is set to ON.
2. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL. Record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.
3. Set OPTICS HOLD switch to OFF and using the control stick and SHAFT ANGLE CDU thumbwheel, drive the SHAFT ANGLE CDU until the CDU indicates 270°. Set OPTICS HOLD switch to ON.
4. Set the SHAFT ANGLE CDU to 270.000° and the 2X TRUNNION CDU to the angle recorded in step 2a using CDU thumbwheel.
5. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust G & N MOUNTING FIXTURE until horizontal reticle line of SXT is coincident with dot and horizontal reticle line of target #1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ________

JOB OPTICS POSITIONAL ACCURACY TEST | **JDC** 10073 **REV** B **PAGE** 2 **OF** 6

SUBSYSTEM G & N SYSTEM | **ASSY**

6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.
7. Cover SXT LLOS and repeat step 6 for SXT StLOS recording VDW reading in line (e) of Data Sheet.
8. Complete lines (d) (f) and (g) of Data Sheet.
9. Sight through SCT 1X eyepiece and adjust 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels until central dot on reticle of target #2 is aligned between crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.
10. Complete line (m) of Data Sheet.
11. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL.
12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeros).
13. Complete lines (p) (q) and (r) of Data Sheet.
14. Place the Variable Deviation Wedge in front of target #1 and repeat steps 3 and 4.
15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.
16. Place Variable Deviation Wedge in front of target #3 and cover target #1.
17. Set VDW to value recorded in line (r) of Data Sheet.
18. Set OPTICS HOLD switch to OFF and using control stick, drive 2X TRUNNION CDU to 90°. Set OPTICS HOLD switch to ON.
19. Using 2X TRUNNION CDU thumbwheel, position SXT StLOS until central dot on reticle of target #3 is aligned to the vertical crosshair on the SXT reticle.
20. Record 2X TRUNNION CDU and AGC display indications in lines (s) and (t) of Data Sheet. Complete lines (w) and (x) of Data Sheet.
21. Set VDW to value recorded in line (x) of Data Sheet.
22. Repeat step 19.
23. Record 2X TRUNNION CDU and AGC display indications in lines (y) and (z) of Data Sheet. Complete lines (ag) and (ah) of Data Sheet.
24. Set VDW to value recorded in line (ah) of Data Sheet.

DATE ________

JOB OPTICS POSITIONAL ACCURACY TEST | **JDC** 10073 **REV** B **PAGE** 3 **OF** 6

SUBSYSTEM G & N SYSTEM | **ASSY**

25. Repeat step 19.
26. Record 2X TRUNNION CDU and AGC display indications in lines (ak) and (am) of Data Sheet. Complete lines (au) and (av) of Data Sheet.
27. Set VDW to value recorded in line (av) of Data Sheet.
28. Repeat step 19.
29. Record 2X TRUNNION CDU and AGC display indications in lines (aw) and (ax) of Data Sheet. Complete lines (be) and (bf) of Data Sheet.
30. Set VDW to value recorded in line (bf) of Data Sheet.
31. Repeat step 19.
32. Record 2X TRUNNION CDU and AGC display indications in lines (bg) and (bh) of Data Sheet. Complete lines (bs) and (bt) of Data Sheet.
33. Set VDW to value recorded in line (bt) of Data Sheet.
34. Repeat step 19.
35. Record 2X TRUNNION CDU and AGC display indications in lines (bu) and (bv) of Data Sheet. Complete lines (cc) and (cd) of Data Sheet.
36. Set VDW to value recorded in line (cd) of Data Sheet.
37. Repeat step 19.
38. Record 2X TRUNNION CDU and AGC display indications in lines (ce) and (cf) of Data Sheet. Complete lines (v) (ab) (ac) (ad) (ae) (af) (ap) (aq) (ar) (as) (at) (az) (ba) (bb) (bc) (bd) (bm) (bn) (bp) (bq) (br) (bx) (by) (bz) (ca) (cb) (ch) (ck) (cm) (cn) and (co) of Data Sheet.
39. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL.
40. Set OPTICS HOLD switch to OFF and using the control stick and SHAFT ANGLE CDU thumbwheel, drive the SHAFT ANGLE CDU until the CDU indicates 270°. Set OPTICS HOLD switch to ON.
41. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N MOUNTING FIXTURE cradle.
42. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFFSET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT reticle pattern.
43. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.
44. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.
45. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to

DATE ________

JOB OPTICS POSITIONAL ACCURACY TEST | **JDC** 10073 **REV** B **PAGE** 4 **OF** 6

SUBSYSTEM G & N SYSTEM | **ASSY**

MANUAL.

46. Sight through the SXT StLOS and, using 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, position the approximate center of the SXT StLOS reticle pattern to the number 10 resolution pattern of target #1.
47. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.
48. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.
49. Sight through the SCT LOS and, using the 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.
50. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.
51. Set Optics Hold switch on G & N indicator control panel to OFF and set to ZERO OPTICS and, after one minute, return selector to MANUAL.
52. Set the 2X TRUNNION CDU to 90.0° and the SHAFT ANGLE CDU to -90.0° (270°) (do not drive thru 180°). Set OPTICS HOLD switch to ON. Sight through SXT eyepiece and, using control stick and 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, drive the StLOS until the center of the SXT reticle pattern is coincident with the reticle dot of target #3.
53. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. Record indications of rows 1 and 2 of G & N AGC DSKY as r 1 and r 2, respectively, in line (ct) of Data Sheet.
54. Monitor TRUN CDU -Δθ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.
55. Set following controls on PRIMARY SIGNAL SELECTOR panel:
    - COUNTER INPUT "D" PULSE to 13
    - D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
    - DIGITAL RECORDER SELECTOR to CTR.
56. Set following controls on COUNTER:
    - SAMPLE TIME (N.) to 002548
    - CLOCK FREQUENCY DIVIDER to 10
    - DISPLAY RESET to ZERO
    - CLOCK SELECTOR to INT
    - FUNCTION to Ratio or Period
    - INPUT SELECTOR to C SENSE
    - SENSE SELECTOR to FWD
    - ATTEN D to 10 AC
    - SLOPE to
    - TRIGGER VOLTAGE - As required
57. Set OPTICS HOLD switch to OFF and set the optics mode selector on G & N indi-

DATE ________

cator control panel to COMPUTER.

58. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

59. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

60. Monitor SHAFT CDU -Δθ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N.) on COUNTER to 002913.

61. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

62. Enter r 1 from step 53 into G & N AGC DSKY. Press ENTER pushbutton. Enter r 2 from step 53 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder. Set OPTICS HOLD switch to ON.

63. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

64. Sight through SXT eyepiece, the center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as r 1 and r 2, respectively, in line (cw) of Data Sheet.

65. Perform calculations (cx) and (cy) on Data Sheet.

66. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in-phase signals on the PAVM:

a. Shaft CDU DAC Error at 45A8J1 pins 34 (high) and 33 (low)

b. Trunnion CDU DAC Error at 45A8J1 pins 26 (high) and 25 (low)

Record indications in lines (cz) and (da) of Data Sheet.

67. Adjust G & N MOUNTING FIXTURE to approximately 25°.

68. Set OPTICS HOLD switch on G & N indicator control panel to OFF and optics mode selector to ZERO OPTICS and, after one minute, return selector to MANUAL.

69. Using control stick and thumbwheel, drive 2X TRUNNION CDU to 50.000° (±0.10°) and SHAFT ANGLE CDU to 180.000° (±0.10°). Set OPTICS HOLD switch to ON.

70. Sight through SXT eyepiece and insure that horizontal reticle of SXT is coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle.

71. Sight through the SXT eyepiece and, using the 2X TRUNNION CDU thumbwheel,

DATE ____________

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position the SXT StLOS until central dot on reticle of target #1 is coincident with central horizontal reticle line of SXT.

72. Record indication of SCT TRUNNION counter and SHAFT counter as (db) and (dc) on Data Sheet.

73. Sight through the SCT 1X eyepiece and, using the 2X TRUNNION CDU thumbwheel, position the SCT LOS until central dot on reticle of target #2 is coincident with central horizontal reticle line of SCT. Record SCT TRUNNION counter indication in line (de) of Data Sheet.

DATE ____________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 12

JDC
NO. 10073
REV. B
INITIAL TDRR 16919

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST

TITLE G & N SYSTEM
SER. NO. ________ **DWG** ________ **REV.** ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______________________ **SER. NO.** ______ ______ CAL DATE
NAME ______________________ **SER. NO.** ______ ______ CAL DATE

CONDUCTED BY ______________ NAME/AFFILIATION **APPROVED BY** ______________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
2	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ________	+0.006			(a)
2	Record SHAFT CDU indication	deg	-0.006	( ) ________	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min	▨	________ ________	▨	▨	▨	(c)
8	Convert Line (c) to sec. using Calibration Chart	Sec	▨	( ) ________	▨	▨	▨	(d)
6	Record VDW Reading of WSTLOS	Deg Min	▨	________ ________	▨	▨	▨	(e)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

DATE ____________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 12

JDC
NO. 10073
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
8	Convert Line (e) to sec. using calibration chart	sec	▨	( ) ________	▨	▨	▨	(f)
8	Calculate: Line (f) - Line (d) StLOS-LLOS parallelism	sec	-10	( ) ________	10			(g)
9	Record 2X TRUNNION CDU indication CDU SCT	deg	▨	( ) ________	▨	▨	▨	(h)
9	Record TRUNNION ANGLE indication TRN	deg	▨	( ) ________	▨	▨	▨	(k)
10	Calculate: Line (h) - Line (a) SCT-SXT parallelism	deg	-0.824	( ) ________	+0.824			(m)

DATE ____________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 12

JDC
NO 10073
REV B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec	▨		▨	▨	▨	(n)
13	Calculate: Line 45° - (n) to nearest second	Sec	▨	( )	▨	▨	▨	(p)
13	Calculate: Line (p) + Line (d)	Sec	▨	( )	▨	▨	▨	(q)
13	Convert Line (q) to VDW Reading using calibration chart	Deg Min	▨		▨	▨	▨	(r)
20	Record AGC display 45° *	bits R_2 deg	16382		16386			(s)
20	Record 2X TRUNNION CDU indication 45°	deg	89.990	( )	90.010			(t)
Imp	Transfer Encoder from JDC 10609-B1 45° 0' 0"	bits	▨		▨	▨	▨	(u)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 12

JDC
NO. 10073
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (s) - Line (u) OSS G & N Comparison 45°	bits	-1	( )	+1			(v)
20	Calculate: Line (q) + 90 sec	sec	▨	( )	▨	▨	▨	(w)
20	Convert Line (w) to VDW Reading using calibration chart	Deg Min	▨		▨	▨	▨	(x)
23	Record AGC display 45° (+ 90") *	bits R_2 deg	▨		▨	▨	▨	(y)
23	Record 2X TRUNNION CDU indication 45° (+ 90")	deg	▨	( )	▨	▨	▨	(z)
Imp	Transfer Encoder from JDC 10609-B1 45° 01' 30"	bits	▨		▨	▨	▨	(aa)
38	Calculate: Line (y) - Line (aa) OSS-G&N Comparison 45° (+ 90")	bits	-1	( )	+1			(ab)
38	Calculate: Line (s) + 00009 bits	bits	▨	( )	▨	▨	▨	(ac)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 12

JDC
NO 10073
REV B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (y) - Line (ac) G & N Accuracy BITS 45° (+ 90")	bits	-1	( )	+1			(ad)
38	Calculate Line (t) + 00.050 deg	deg	▨	( )	▨	▨	▨	(ae)
38	Calculate: Line (z) - Line (ae) G & N Accuracy CDU 45° (+ 90")	deg	-.006	( )	+.006			(af)
23	Calculate: Line (q) + 30 sec	sec	▨	( )	▨	▨	▨	(ag)
23	Convert Line (ag) to VDW Reading using calibration chart	Deg Min	▨		▨	▨	▨	(ah)
26	Record AGC display 45° (+ 30")*	bits R_2 deg	▨		▨	▨	▨	(ak)
26	Record 2X TRUNNION CDU indication 45° (+ 30")	deg	▨	( )	▨	▨	▨	(am)
Imp	Transfer Encoder Count from JDC 10609-B1 45° 0' 30"	bits	▨		▨	▨	▨	(an)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 12

JDC
NO. 10073
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (ak) - Line (an) OSS-G&N Comparison 45° (+ 30")	bits	-1	( )	+1			(ap)
38	Calculate: Line (s) + 00003 bits	bits	▨	( )	▨	▨	▨	(aq)
38	Calculate: Line (ak) - Line (aq) G & N Accuracy BITS 45° (+ 30")	bits	-1	( )	+1			(ar)
38	Calculate: Line (t) + 00.017 deg	deg	▨	( )	▨	▨	▨	(as)
38	Calculate: Line (am) - Line (as) G & N Accuracy CDU 45° (+ 30")	deg	-.006	( )	+.006			(at)
26	Calculate: Line (q) + 60 sec	sec	▨	( )	▨	▨	▨	(au)
26	Convert Line (au) to VDW Reading using calibration chart	Deg Min	▨		▨	▨	▨	(av)
29	Record AGC display 45° (+ 60")*	bits R_2 deg	▨		▨	▨	▨	(aw)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 12

JDC
NO. 10073
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Record 2X TRUNNION CDU indication 45° (+60")	deg	▨	( ) ______	▨	▨	▨	(ax)
Imp	Transfer Encoder Count from JDC 10609-B1 45° 01' 00"	bits	▨	______	▨	▨	▨	(ay)
38	Calculate: Line (aw) - Line (ay) OSS-G&N Comparison 45° (+60")	bits	-1	( ) ______	+1			(az)
38	Calculate: Line (s) +00006 bits	bits	▨	( ) ______	▨	▨	▨	(ba)
38	Calculate: Line (aw) - Line (ba) G & N Accuracy BITS 45° (+60")	bits	-1	( ) ______	+1			(bb)
38	Calculate: Line (t) +00.033 deg	deg	▨	( ) ______	▨	▨	▨	(bc)
38	Calculate: Line (ax) - Line (bc) G & N Accuracy CDU 45 (+60")	deg	-.006	( ) ______	+.006			(bd)
29	Calculate: Line (q) - 30 sec	sec	▨	( ) ______	▨	▨	▨	(be)

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 12

JDC
NO. 10073
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Convert Line (be) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(bf)
32	Record AGC display 45° (-30") *	bits R_2 deg	▨	______ ______	▨	▨	▨	(bg)
32	Record 2X TRUNNION CDU indication 45° (-30")	deg	▨	( ) ______	▨	▨	▨	(bh)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 59' 30"	bits	▨	______	▨	▨	▨	(bk)
38	Calculate: Line (bg) - Line (bk) OSS- G&N Comparison 45° (-30")	bits	-1	( ) ______	+1			(bm)
38	Calculate: Line (s) -00003 bits	bits	▨	( ) ______	▨	▨	▨	(bn)
38	Calculate: Line (bg) - Line (bn) G & N Accuracy BITS 45° (-30")	bits	-1	( ) ______	+1			(bp)
38	Calculate: Line (t) -00.017 deg	deg	▨	( ) ______	▨	▨	▨	(bq)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 12

JDC
NO. 10073
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (bh) - Line (bq) G & N Accuracy CDU 45 (-30")	deg	-.006	( ) ______	+.006			(br)
32	Calculate: Line (q) - 90 sec	sec	▨	( ) ______	▨	▨	▨	(bs)
32	Convert Line (bs) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(bt)
35	Record AGC display 45 (-90")*	bits R_2 deg	▨	______ ______	▨	▨	▨	(bu)
35	Record 2X TRUNNION CDU indication 45 (-90")	deg	▨	( ) ______	▨	▨	▨	(bv)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 58' 30"	bits	▨	______	▨	▨	▨	(bw)
38	Calculate: Line (bu) - Line (bw) OSS-G & NComparison 45 (-90")	bits	-1	( ) ______	1			(bx)
38	Calculate: Line (s) -00009 bits	bits	▨	( ) ______	▨	▨	▨	(by)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 12

JDC
NO. 10073
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (bu) - Line (by) G & N Accuracy BITS 45° (-90")	bits	-1	( ) ______	+1			(bz)
38	Calculate: Line (t) -00.050 deg	deg	▨	( ) ______	▨	▨	▨	(ca)
38	Calculate: Line (bv) - Line (ca) G & N Accuracy CDU 45° (-90")	deg	-.006	( ) ______	+.006			(cb)
35	Calculate: Line (q) - 60 sec	sec	▨	( ) ______	▨	▨	▨	(cc)
35	Convert Line (cc) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(cd)
38	Record AGC display 45° (-60") *	bits R_2 deg	▨	______ ______	▨	▨	▨	(ce)
38	Record 2X TRUNNION CDU indication 45° (-60")	deg	▨	( ) ______	▨	▨	▨	(cf)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 59' 00"	bits	▨	______	▨	▨	▨	(cg)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 12

JDC
NO. 10073
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (ce) - Line (cg) OSS-G&N Comparison 45° (-60")	bits	-1	( ) ___	+1			(ch)
38	Calculate: Line (s) -00006 bits	bits	▨	( ) ___	▨	▨	▨	(ck)
38	Calculate: Line (ce) - Line (ck) G & N Accuracy BITS 45° (-60")	bits	-1	( ) ___	+1			(cm)
38	Calculate: Line (t) -00.033 deg	deg	▨	( ) ___	▨	▨	▨	(cn)
38	Calculate: Line (cf) - Line (cn) G & N Accuracy CDU 45° (-60")	deg	-.006	( ) ___	+.006			(cp)
42	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cq)
43	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cr)
47 50	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(cs)
53	AGC DSKY indication	R_1 deg R_2 deg	▨	___ ___	▨	▨	▨	(ct)

DATE ___

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 12

JDC
NO. 10073
REV. B

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	TRUN DAC slew	sec	0	___	14.0			(cu)
62	Shaft DAC slew	sec	0	___	8.0			(cv)
64	AGC DSKY indication	R_1 deg R_2 deg	▨	___ ___	▨	▨	▨	(cw)
65	Calculate: Line (cw) R_1 - Line (ct) R_1 (SHAFT)	deg	-.02	( ) ___	+.02			(cx)
65	Calculate: Line (cw) R_2 - Line (ct) R_2 (TRUNNION)	deg	-.005	( ) ___	+.005			(cy)
66	Shaft CDU DAC error	mv	0	___	100			(cz)
66	TRUN CDU DAC error	mv	0	___	100			(da)
72	TRUN TPAC	deg	24.43		25.30			(db)
	SHAFT TPAC	deg	179.60		182.40			(dc)
73	SCT TRUNNION angle	deg	24.599		26.247			(de)

DATE ___

[illegible]

[illegible] SXT [illegible] and sight through SXT [illegible] until target [illegible] clearly. Adjust VDW [illegible] vertical reticle line of SXT is [illegible] with dot and vertical reticle line [illegible] #1. Record dial reading of VDW [illegible] Data Sheet. Uncover St LOS. [illegible] cover SXT LLOS and repeat step 6 for [illegible] recording VDW reading in line [illegible] Data Sheet.

[illegible] Complete lines [illegible] (f) and (g) of Data Sheet.

[illegible] SCT 1X eyepiece and adjust [illegible] and SHAFT ANGLE CDU [illegible] until central dot on reticle of target [illegible] crosshairs on [illegible] reticle. Record 2X TRUNNION CDU [illegible] of Data Sheet. Record [illegible] indicated on Optics [illegible] of Data Sheet.

[illegible] of Data Sheet.

[illegible] selector on G & N indicator [illegible] ZERO OPTICS and, after [illegible] selector to [illegible]

[illegible] VERB [illegible] NOUN 55 [illegible] DSKY. Press ENTER pushbutton. [illegible]

[illegible] Data Sheet.

14. Place the Variable Deviation Wedge in front of target #1 and repeat steps 3 and 4.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set OPTICS HOLD switch to OFF and using control stick, drive 2X TRUNNION CDU to 90°. Set OPTICS HOLD switch to ON.

19. Using 2X TRUNNION CDU thumbwheel, position SXT St LOS until central dot on reticle of target #3 is aligned to the vertical crosshair on the SXT reticle.

20. Record 2X TRUNNION CDU and AGC display indications in lines (s) and (t) of Data Sheet. Complete lines (w) and (x) of Data Sheet.

21. Set VDW to value recorded in line (x) of Data Sheet.

22. Repeat step 19.

23. Record 2X TRUNNION CDU and AGC display indications in lines (y) and (z) of Data Sheet. Complete lines (ag) and (ah) of Data Sheet.

24. Set VDW to value recorded in line (ah) of Data Sheet.

DATE __________

[illegible]

[illegible]

[illegible] SXT St LOS and, using [illegible] SHAFT ANGLE CDU [illegible] the approximate [illegible] of the SXT St LOS reticle pattern to the number 10 resolution pattern of target [illegible]

[illegible] St LOS and LLOS and [illegible] the number 10 and surrounding lines [illegible] reticle. The number 10 and surrounding lines shall be clear and distinct.

[illegible] the SCT resolution card approximately 10 feet from the SCT trunnion [illegible]

[illegible] Sight through the SCT LOS and, using the 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, position the approximate [illegible] of the SCT LOS reticle pattern to the [illegible] resolution pattern of the resolution card.

50. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

51. Set Optics Hold switch on G & N indicator control panel to OFF and set to ZERO OPTICS and, after one minute, return selector to MANUAL.

52. Set the 2X TRUNNION CDU to [illegible] and the SHAFT ANGLE CDU to [illegible] (do not drive thru 180°). Set OPTICS HOLD switch to ON. Sight through SXT eyepiece and, using control stick and 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, drive the St LOS until the center of the SXT reticle pattern is coincident with the reticle dot of target #3.

53. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. Record indications of rows 1 and 2 of G & N AGC DSKY as r 1 and r 2, respectively, in line (ct) of Data Sheet.

54. Monitor TRUN CDU -$\Delta\theta$ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

55. Set following controls on PRIMARY SIGNAL SELECTOR panel:
  - COUNTER INPUT "D" PULSE to 13
  - D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
  - DIGITAL RECORDER SELECTOR to CTR.

56. Set following controls on COUNTER:
  - SAMPLE TIME (N_1) to 002548
  - CLOCK FREQUENCY DIVIDER to 10
  - DISPLAY RESET to ZERO
  - CLOCK SELECTOR to INT
  - FUNCTION to Ratio or Period
  - INPUT SELECTOR to C SENSE
  - SENSE SELECTOR to FWD
  - ATTEN D to 10 AC
  - SLOPE to +
  - TRIGGER VOLTAGE - As required

57. Enter (and verify) VERB 53 NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. Set OPTICS HOLD switch to OFF and set the optics mode selector on G & N indi-

[illegible]

digital recorder [illegible]
to ON.

63. Enter and verify [illegible] into G & N AGC [illegible] Press [illegible] pushbutton.

64. Sight through SXT [illegible] of SXT reticle shall be [illegible]

[illegible]

DATE ____

[illegible]

JDC
NO. 10073
REV. C

[illegible]	[illegible]	[illegible]	[illegible] VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
[illegible]	[illegible]	[illegible]	▨	( ) ____	▨	▨	▨	(f)
[illegible]	[illegible]	[illegible]	10	( ) ____	10			(g)
[illegible]	Record [illegible] CDU indication CDU [illegible]	deg	▨	( ) ____	▨	▨	▨	(h)
[illegible]	Record [illegible] ANGLE indication TRN	deg	▨	( ) ____	▨	▨	▨	(k)
[illegible]	Calculate Line [illegible] Line of SXT-[illegible] parallelism	deg	-0.824	( ) ____	+0.824			(m)

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 **OF** 12

JDC
NO. 10073
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec	▨	______ ______ ______	▨	▨	▨	(n)
13	Calculate: Line 45° - (n) to nearest second	Sec	▨	( ) ______	▨	▨	▨	(p)
13	Calculate: Line (p) + Line (d)	Sec	▨	( ) ______	▨	▨	▨	(q)
13	Convert Line (q) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(r)
20	Record AGC display 45° *	bits R_2 deg	16382	______ __ __ . __ __ __	16386			(s)
20	Record 2X TRUNNION CDU indication 45°	deg	89.990	( ) ______	90.010			(t)
Imp	Transfer Encoder from JDC 10609-B1 45° 0' 0"	bits	▨	______	▨	▨	▨	(u)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 **OF** 12

JDC
NO. 10073
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (s) - Line (u) OSS G & N Comparison 45°	bits	-1	( ) ______	+1			(v)
20	Calculate: Line (q) + 90 sec	sec	▨	( ) ______	▨	▨	▨	(w)
20	Convert Line (w) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(x)
23	Record AGC display 45° (+ 90") *	bits R_2 deg	▨	______ __ __ . __ __ __	▨	▨	▨	(y)
23	Record 2X TRUNNION CDU indication 45° (+ 90")	deg	▨	( ) ______	▨	▨	▨	(z)
Imp	Transfer Encoder from JDC 10609-B1 45° 01' 30"	bits	▨	______	▨	▨	▨	(aa)
38	Calculate: Line (y) - Line (aa) OSS-G&N Comparison 45° (+ 90")	bits	-1	( ) ______	+1			(ab)
38	Calculate: Line (s) + 00009 bits	bits	▨	( ) ______	▨	▨	▨	(ac)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 12

JDC
NO. 10073
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (y) - Line (ac) G & N Accuracy BITS 45° (+ 90")	bits	-1	( ) ______	+1			(ad)
38	Calculate Line (t) + 00.050 deg	deg	▨	( ) ______	▨	▨	▨	(ae)
38	Calculate: Line (z) - Line (ae) G & N Accuracy CDU 45° (+ 90")	deg	-.006	( ) ______	+.006			(af)
23	Calculate: Line (q) + 30 sec	sec	▨	( ) ______	▨	▨	▨	(ag)
23	Convert Line (ag) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(ah)
26	Record AGC display 45° (+ 30")*	bits R_2 deg	▨	______ ______	▨	▨	▨	(ak)
26	Record 2X TRUNNION CDU indication 45° (+ 30")	deg	▨	( ) ______	▨	▨	▨	(am)
Imp	Transfer Encoder Count from JDC 10609-B1 45° 0' 30"	bits	▨	______	▨	▨	▨	(an)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 12

JDC
NO. 10073
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (ak) - Line (an) OSS-G&N Comparison 45° (+ 30")	bits	-1	( ) ______	+1			(ap)
38	Calculate: Line (s) + 00003 bits	bits	▨	( ) ______	▨	▨	▨	(aq)
38	Calculate: Line (ak) - Line (aq) G & N Accuracy BITS 45° (+ 30")	bits	-1	( ) ______	+1			(ar)
38	Calculate: Line (t) + 00.017 deg	deg	▨	( ) ______	▨	▨	▨	(as)
38	Calculate: Line (am) - Line (as) G & N Accuracy CDU 45° (+ 30")	deg	-.006	( ) ______	+.006			(at)
26	Calculate: Line (q) + 60 sec	sec	▨	( ) ______	▨	▨	▨	(au)
26	Convert Line (au) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(av)
29	Record AGC display 45° (+ 60")*	bits R_2 deg	▨	______ ______	▨	▨	▨	(aw)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 12

JDC
NO. 10073
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Record 2X TRUNNION CDU indication 45° (+60")	deg	▨	( ) ______	▨	▨	▨	(ax)
Imp	Transfer Encoder Count from JDC 10609-B1 45° 01' 00"	bits	▨	______	▨	▨	▨	(ay)
38	Calculate: Line (aw) - Line (ay) OSS-G&N Comparison 45° (+60")	bits	-1	( ) ______	+1			(az)
38	Calculate: Line (s) +00006 bits	bits	▨	( ) ______	▨	▨	▨	(ba)
38	Calculate: Line (aw) - Line (ba) G & N Accuracy BITS 45° (+60")	bits	-1	( ) ______	+1			(bb)
38	Calculate: Line (t) +00.033 deg	deg	▨	( ) ______	▨	▨	▨	(bc)
38	Calculate: Line (ax) - Line (bc) G & N Accuracy CDU 45° (+60)	deg	-.006	( ) ______	+.006			(bd)
29	Calculate: Line (q) - 30 sec	sec	▨	( ) ______	▨	▨	▨	(be)

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 12

JDC
NO. 10073
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Convert Line (be) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(bf)
32	Record AGC display 45° (-30") *	bits R_2 deg	▨	______ ______	▨	▨	▨	(bg)
32	Record 2X TRUNNION CDU indication 45° (-30")	deg	▨	( ) ______	▨	▨	▨	(bh)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 59' 30"	bits	▨	______	▨	▨	▨	(bk)
38	Calculate: Line (bg) - Line (bk) OSS- G&N Comparison 45° (-30")	bits	-1	( ) ______	+1			(bm)
38	Calculate: Line (s) -00003 bits	bits	▨	( ) ______	▨	▨	▨	(bn)
38	Calculate: Line (bg) - Line (bn) G & N Accuracy BITS 45° (-30")	bits	-1	( ) ______	+1			(bp)
38	Calculate: Line (t) -00.017 deg	deg	▨	( ) ______	▨	▨	▨	(bq)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 OF 12

JDC
NO. 10073
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (bh) - Line (bq) G & N Accuracy CDU 45° (-30")	deg	-.006	( ) ______	+.006			(br)
32	Calculate: Line (q) - 90 sec	sec	▨	( ) ______	▨	▨	▨	(bs)
32	Convert Line (bs) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(bt)
35	Record AGC display 45° (-90")*	bits R_2 deg	▨	______ ______	▨	▨	▨	(bu)
35	Record 2X TRUNNION CDU indication 45° (-90")	deg	▨	( ) ______	▨	▨	▨	(bv)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 58' 30"	bits	▨	______	▨	▨	▨	(bw)
38	Calculate: Line (bu) - Line (bw) OSS-G & NComparison 45° (-90")	bits	-1	( ) ______	+1			(bx)
38	Calculate: Line (s) -00009 bits	bits	▨	( ) ______	▨	▨	▨	(by)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 OF 12

JDC
NO. 10073
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (bu) - Line (by) G & N Accuracy BITS 45° (-90")	bits	-1	( ) ______	+1			(bz)
38	Calculate: Line (t) -00.050 deg	deg	▨	( ) ______	▨	▨	▨	(ca)
38	Calculate: Line (bv) - Line (ca) G & N Accuracy CDU 45° (-90")	deg	-.006	( ) ______	+.006			(cb)
35	Calculate: Line (q) - 60 sec	sec	▨	( ) ______	▨	▨	▨	(cc)
35	Convert Line (cc) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(cd)
38	Record AGC display 45° (-60") *	bits R_2 deg	▨	______ ______	▨	▨	▨	(ce)
38	Record 2X TRUNNION CDU indication 45° (-60")	deg	▨	( ) ______	▨	▨	▨	(cf)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 59' 00"	bits	▨	______	▨	▨	▨	(cg)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 12

JDC
NO. 10073
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (ce) - Line (cg) OSS-G&N Comparison 45° (-60")	bits	-1	( ) ______	+1			(ch)
38	Calculate: Line (s) -00006 bits	bits	▨	( ) ______	▨	▨	▨	(ck)
38	Calculate: Line (ce) - Line (ck) G & N Accuracy BITS 45° (-60")	bits	-1	( ) ______	+1			(cm)
38	Calculate: Line (t) -00.033 deg	deg	▨	( ) ______	▨	▨	▨	(cn)
38	Calculate: Line (cf) - Line (cn) G & N Accuracy CDU 45° (-60")	deg	-.006	( ) ______	+.006			(cp)
42	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cq)
43	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cr)
47 50	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(cs)
53	AGC DSKY indication	R_1 deg R_2 deg	▨	______ ______	▨	▨	▨	(ct)

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 12

JDC
NO. 10073
REV. C

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	TRUN DAC slew	sec	0	______	14.0			(cu)
62	Shaft DAC slew	sec	0	______	8.0			(cv)
64	AGC DSKY indication	R_1 deg R_2 deg	▨	______ ______	▨	▨	▨	(cw)
65	Calculate: Line (cw) R_1 - Line (ct) R_1 (SHAFT)	deg	-.02	( ) ______	+.02			(cx)
65	Calculate: Line (cw) R_2 - Line (ct) R_2 (TRUNNION)	deg	-.005	( ) ______	+.005			(cy)
66	Shaft CDU DAC error	mv	0	______	100			(cz)
66	TRUN CDU DAC error	mv	0	______	100			(da)
72	TRUN TPAC	deg	24.43		25.30			(db)
	SHAFT TPAC	deg	179.60		182.40			(dc)
73	SCT TRUNNION angle	deg	24.599		26.247			(de)

DATE ______

JOB OPTICS POSITIONAL ACCURACY TEST

JDC 10073 **REV.** D **PAGE** 1 **OF** 6

INITIAL TDRR 16919 **D.S PGS** 12

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and CDU DAC slew characteristics are checked in this test. In addition, comparison is made with corresponding prelog data.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5-11-65	19030	6	2, 12, 13	WK	TM
B	6-22-65	20268	6	3-5, 7-10	WK	TM
C	7-7-65	20612	4	-	WK	JB
D	7-13-65	20740	-	2	WK	WJR

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1025500

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1025500 and Data Sheets 10073, 10609 and 10003.

IMPORTANT: Proceed with this JDC if JDC 10063 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10061, Part III before proceeding with this JDC.

Data from JDC 10003 and JDC 10609 must be transferred to lines (n) (u) (aa) (an) (ay) (bk) (bw) and (cg) of JDC 10073 Data Sheet before proceeding with this JDC.

1. Insure that the G & N MOUNTING FIXTURE is at a tilt angle of zero degrees and that the OPTICS HOLD switch is set to ON.

2. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL. Record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.

3. Set OPTICS HOLD switch to OFF and using the control stick and SHAFT ANGLE CDU thumbwheel, drive the SHAFT ANGLE CDU until the CDU indicates 270°. Set OPTICS HOLD switch to ON.

4. Set the SHAFT ANGLE CDU to 270.000° and the 2X TRUNNION CDU to the angle recorded in step 2a using CDU thumbwheel.

5. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust G & N MOUNTING FIXTURE until horizontal reticle line of SXT is coincident with dot and horizontal reticle line of target #1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB OPTICS POSITIONAL ACCURACY TEST | **JDC** 10073 **REV** D **PAGE** 2 **OF** 6

SUBSYSTEM G & N SYSTEM | **ASSY**

6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.

7. Cover SXT LLOS and repeat step 6 for SXT StLOS recording VDW reading in line (e) of Data Sheet.

8. Complete lines (d) (f) and (g) of Data Sheet.

9. Sight through SCT 1X eyepiece and adjust 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels until central dot on reticle of target #2 is aligned between crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL.

12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeros).

13. Complete lines (p) (q) and (r) of Data Sheet.

14. Place the Variable Deviation Wedge in front of target #1 and repeat steps 3 and 4.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set OPTICS HOLD switch to OFF and using control stick, drive 2X TRUNNION CDU to 90°. Set OPTICS HOLD switch to ON.

19. Using 2X TRUNNION CDU thumbwheel, position SXT StLOS until central dot on reticle of target #3 is aligned to the vertical crosshair on the SXT reticle.

20. Record 2X TRUNNION CDU and AGC display indications in lines (s) and (t) of Data Sheet. Complete lines (w) and (x) of Data Sheet.

21. Set VDW to value recorded in line (x) of Data Sheet.

22. Repeat step 19.

23. Record 2X TRUNNION CDU and AGC display indications in lines (y) and (z) of Data Sheet. Complete lines (ag) and (ah) of Data Sheet.

24. Set VDW to value recorded in line (ah) of Data Sheet.

DATE ______

JOB OPTICS POSITIONAL ACCURACY TEST | **JDC** 10073 **REV** D **PAGE** 3 **OF** 6

SUBSYSTEM G & N SYSTEM | **ASSY**

25. Repeat step 19.

26. Record 2X TRUNNION CDU and AGC display indications in lines (ak) and (am) of Data Sheet. Complete lines (au) and (av) of Data Sheet.

27. Set VDW to value recorded in line (av) of Data Sheet.

28 Repeat step 19.

29. Record 2X TRUNNION CDU and AGC display indications in lines (aw) and (ax) of Data Sheet. Complete lines (be) and (bf) of Data Sheet.

30. Set VDW to value recorded in line (bf) of Data Sheet.

31. Repeat step 19.

32. Record 2X TRUNNION CDU and AGC display indications in lines (bg) and (bh) of Data Sheet. Complete lines (bs) and (bt) of Data Sheet.

33. Set VDW to value recorded in line (bt) of Data Sheet.

34. Repeat step 19.

35. Record 2X TRUNNION CDU and AGC display indications in lines (bu) and (bv) of Data Sheet. Complete lines (cc) and (cd) of Data Sheet.

36. Set VDW to value recorded in line (cd) of Data Sheet.

37. Repeat step 19.

38. Record 2X TRUNNION CDU and AGC display indications in lines (ce) and (cf) of Data Sheet. Complete lines (v) (ab) (ac) (ad) (ae) (af) (ap) (aq) (ar) (as) (at) (az) (ba) (bb) (bc) (bd) (bm) (bn) (bp) (bq) (br) (bx) (by) (bz) (ca) (cb) (ch) (ck) (cm) (cn) and (cp) of Data Sheet.

39. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL.

40. Set OPTICS HOLD switch to OFF and using the control stick and SHAFT ANGLE CDU thumbwheel, drive the SHAFT ANGLE CDU until the CDU indicates 270°. Set OPTICS HOLD switch to ON.

41. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N MOUNTING FIXTURE cradle.

42. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFFSET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT reticle pattern.

43. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

44. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.

45. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to

DATE ______

JOB OPTICS POSITIONAL ACCURACY TEST | **JDC** 10073 **REV** D · **PAGE** 4 **OF** 6

SUBSYSTEM G & N SYSTEM | **ASSY**

MANUAL.

46. Sight through the SXT StLOS and, using 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, position the approximate center of the SXT StLOS reticle pattern to the number 10 resolution pattern of target #1.

47. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

48. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

49. Sight through the SCT LOS and, using the 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

50. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

51. Set Optics Hold switch on G & N indicator control panel to OFF and set to ZERO OPTICS and, after one minute, return selector to MANUAL.

52. Set the 2X TRUNNION CDU to 90.0° and the SHAFT ANGLE CDU to -90.0° (270°) (do not drive thru 180°). Set OPTICS HOLD switch to ON. Sight through SXT eyepiece and, using control stick and 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, drive the StLOS until the center of the SXT reticle pattern is coincident with the reticle dot of target #3.

53. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. Record indications of rows 1 and 2 of G & N AGC DSKY as r 1 and r 2, respectively, in line (ct) of Data Sheet.

54. Monitor TRUN CDU $-\Delta\theta$ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

55. Set following controls on PRIMARY SIGNAL SELECTOR panel:
    - COUNTER INPUT "D" PULSE to 13
    - D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
    - DIGITAL RECORDER SELECTOR to CTR.

56. Set following controls on COUNTER:
    - SAMPLE TIME (N_1) to 002548
    - CLOCK FREQUENCY DIVIDER to 10
    - DISPLAY RESET to ZERO
    - CLOCK SELECTOR to INT
    - FUNCTION to Ratio or Period
    - INPUT SELECTOR to C SENSE
    - SENSE SELECTOR to FWD
    - ATTEN D to 10 AC
    - SLOPE to +
    - TRIGGER VOLTAGE - As required

57. Enter (and verify) VERB 53 NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. Set OPTICS HOLD switch to OFF and set the optics mode selector on G & N indi-

cator control panel to COMPUTER.

58. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

59. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

60. Monitor SHAFT CDU $-\Delta\theta$ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N_1) on COUNTER to 002913.

61. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

62. Enter r 1 from step 53 into G & N AGC DSKY. Press ENTER pushbutton. Enter r 2 from step 53 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder. Set OPTICS HOLD switch to ON.

63. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

64. Sight through SXT eyepiece, the center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as r 1 and r 2, respectively, in line (cw) of Data Sheet.

65. Perform calculations (cx) and (cy) on Data Sheet.

66. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in phase signals on the PAVM:

a. Shaft CDU DAC Error at 45A8J1 pins 34 (high) and 33 (low)
b. Trunnion CDU DAC Error at 45A8J1 pins 26 (high) and 25 (low)

Record indications in lines (cz) and (da) of Data Sheet.

67. Adjust G & N MOUNTING FIXTURE to approximately 25°.

68. Set OPTICS HOLD switch on G & N indicator control panel to OFF and optics mode selector to ZERO OPTICS and, after one minute, return selector to MANUAL.

69. Using control stick and thumbwheel, drive 2X TRUNNION CDU to 50.000° (±0.10°) and SHAFT ANGLE CDU to 180.000° (±0.10°). Set OPTICS HOLD switch to ON.

70. Sight through SXT eyepiece and insure that horizontal reticle of SXT is coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle.

71. Sight through the SXT eyepiece and, using the 2X TRUNNION CDU thumbwheel,

DATE ________

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position the SXT StLOS until central dot on reticle of target #1 is coincident with central horizontal reticle line of SXT.

72. Record indication of SCT TRUNNION counter and SHAFT counter as (db) and (dc) on Data Sheet.

73. Sight through the SCT 1X eyepiece and, using the 2X TRUNNION CDU thumbwheel, position the SCT LOS until central dot on reticle of target #2 is coincident with central horizontal reticle line of SCT. Record SCT TRUNNION counter indication in line (de) of Data Sheet.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 12

JDC
NO. 10073
REV. D
INITIAL TDRR 16919

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST

TITLE G & N SYSTEM
SER. NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________________ SER. NO. ______ CAL DATE ______
NAME ________________ SER. NO. ______ CAL DATE ______

CONDUCTED BY ________________ NAME/AFFILIATION APPROVED BY ________________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
2	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ____________	+0.006			(a)
2	Record SHAFT CDU indication	deg	-0.006	( ) ____________	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min	▨	____________ ____________	▨	▨	▨	(c)
8	Convert Line (c) to sec. using Calibration Chart	Sec	▨	( ) ____________	▨	▨	▨	(d)
6	Record VDW Reading of WSTLOS	Deg Min	▨	____________ ____________	▨	▨	▨	(e)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 12

JDC
NO. 10073
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
8	Convert Line (e) to sec. using calibration chart	sec	▨	( ) ____________	▨	▨	▨	(f)
8	Calculate Line (f) - Line (d) StLOS-LLOS parallelism	sec	-15	( ) ____________	+15			(g)
9	Record 2X TRUNNION CDU indication CDU SCT	deg	▨	( ) ____________	▨	▨	▨	(h)
9	Record TRUNNION ANGLE indication TRN	deg	▨	( ) ____________	▨	▨	▨	(k)
10	Calculate: Line (h) -Line (a) SCT-SXT parallelism	deg	-0.824	( ) ____________	+0.824			(m)

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 12

JDC
NO. 10073
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
Imp	Transfer target calibration angle ϵ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec	▨	______ ______ ______	▨	▨	▨	(n)
13	Calculate: Line 45° - (n) to nearest second	Sec	▨	( ) ______	▨	▨	▨	(p)
13	Calculate: Line (p) + Line (d)	Sec	▨	( ) ______	▨	▨	▨	(q)
13	Convert Line (q) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(r)
20	Record AGC display 45° *	bits R_2 deg	16382	______ __ __ . __ __ __	16386			(s)
20	Record 2X TRUNNION CDU indication 45°	deg	89.990	( ) ______	90.010			(t)
Imp	Transfer Encoder from JDC 10609-B1 45° 0' 0"	bits	▨	______	▨	▨	▨	(u)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 12

JDC
NO. 10073
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (s) - Line (u) OSS G & N Comparison 45°	bits	-1	( ) ______	+1			(v)
20	Calculate: Line (q) + 90 sec	sec	▨	( ) ______	▨	▨	▨	(w)
20	Convert Line (w) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(x)
23	Record AGC display 45° (+ 90") *	bits R_2 deg	▨	______ __ __ . __ __ __	▨	▨	▨	(y)
23	Record 2X TRUNNION CDU indication 45° (+ 90")	deg	▨	( ) ______	▨	▨	▨	(z)
Imp	Transfer Encoder from JDC 10609-B1 45° 01' 30"	bits	▨	______	▨	▨	▨	(aa)
38	Calculate: Line (y) - Line (aa) OSS-G&N Comparison 45° (+ 90")	bits	-1	( ) ______	+1			(ab)
38	Calculate: Line (s) + 00009 bits	bits	▨	( ) ______	▨	▨	▨	(ac)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 12

JDC
NO 10073
REV D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (y) - Line (ac) G & N Accuracy BITS 45 (+ 90")	bits	-1	( ) ______	+1			(ad)
38	Calculate Line (t) + 00.050 deg	deg	▨	( ) ______	▨	▨	▨	(ae)
38	Calculate: Line (z) - Line (ae) G & N Accuracy CDU 45° (+ 90")	deg	-.006	( ) ______	+.006			(af)
23	Calculate: Line (q) + 30 sec	sec	▨	( ) ______	▨	▨	▨	(ag)
23	Convert Line (ag) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(ah)
26	Record AGC display 45° (+ 30")*	bits R_2 deg	▨	______ ______	▨	▨	▨	(ak)
26	Record 2X TRUNNION CDU indication 45° (+ 30")	deg	▨	( ) ______	▨	▨	▨	(am)
Imp	Transfer Encoder Count from JDC 10609-B1 45° 0' 30"	bits	▨	______	▨	▨	▨	(an)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 12

JDC
NO. 10073
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (ak) - Line (an) OSS-G&N Comparison 45° (+ 30")	bits	-1	( ) ______	+1			(ap)
38	Calculate: Line (s) + 00003 bits	bits	▨	( ) ______	▨	▨	▨	(aq)
38	Calculate: Line (ak) - Line (aq) G & N Accuracy BITS 45° (+ 30")	bits	-1	( ) ______	+1			(ar)
38	Calculate: Line (t) + 00.017 deg	deg	▨	( ) ______	▨	▨	▨	(as)
38	Calculate: Line (am) - Line (as) G & N Accuracy CDU 45° (+ 30")	deg	-.006	( ) ______	+.006			(at)
26	Calculate: Line (q) + 60 sec	sec	▨	( ) ______	▨	▨	▨	(au)
26	Convert Line (au) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(av)
29	Record AGC display 45 (+ 60")*	bits R_2 deg	▨	______ ______	▨	▨	▨	(aw)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 12

JDC
NO. 0073
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Record 2X TRUNNION CDU indication 45° (+60")	deg	▨	( ) ________	▨	▨	▨	(ax)
Imp	Transfer Encoder Count from JDC 10609-B1 45° 01' 00"	bits	▨	________	▨	▨	▨	(ay)
38	Calculate: Line (aw) - Line (ay) OSS-G&N Comparison 45 (+60")	bits	-1	( ) ________	+1			(az)
38	Calculate: Line (s) +00006 bits	bits	▨	( ) ________	▨	▨	▨	(ba)
38	Calculate: Line (aw) - Line (ba) G & N Accuracy BITS 45° (+60")	bits	-1	( ) ________	+1			(bb)
38	Calculate: Line (t) +00.033 deg	deg	▨	( ) ________	▨	▨	▨	(bc)
38	Calculate: Line (ax) - Line (bc) G & N Accuracy CDU 45° (+60")	deg	-.006	( ) ________	+.006			(bd)
29	Calculate: Line (q) - 30 sec	sec	▨	( ) ________	▨	▨	▨	(be)

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 12

JDC
NO. 10073
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Convert Line (be) to VDW Reading using calibration chart	Deg Min	▨	________ ________	▨	▨	▨	(bf)
32	Record AGC display 45 (-30") *	bits R_2 deg	▨	________ ________	▨	▨	▨	(bg)
32	Record 2X TRUNNION CDU indication 45 (-30")	deg	▨	( ) ________	▨	▨	▨	(bh)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 59' 30"	bits	▨	________	▨	▨	▨	(bk)
38	Calculate: Line (bg) - Line (bk) OSS- G&N Comparison 45 (-30")	bits	-1	( ) ________	+1			(bm)
38	Calculate: Line (s) -00003 bits	bits	▨	( ) ________	▨	▨	▨	(bn)
38	Calculate: Line (bg) - Line (bn) G & N Accuracy BITS 45 (-30")	bits	-1	( ) ________	+1			(bp)
38	Calculate: Line (t) -00.017 deg	deg	▨	( ) ________	▨	▨	▨	(bq)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 12

JDC
NO. 10073
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (bh) - Line (bq) G & N Accuracy CDU 45 (-30")	deg	-.006	( ) ________	+.006			(br)
32	Calculate: Line (q) - 90 sec	sec	▨	( ) ________	▨	▨	▨	(bs)
35	Convert Line (bs) to VDW Reading using calibration chart	Deg Min	▨	________ ________	▨	▨	▨	(bt)
35	Record AGC display 45° (-90")*	bits R_2 deg	▨	________ ________	▨	▨	▨	(bu)
35	Record 2X TRUNNION CDU indication 45° (-90")	deg	▨	( ) ________	▨	▨	▨	(bv)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 58' 30"	bits	▨	________	▨	▨	▨	(bw)
38	Calculate: Line (bu) - Line (bw) OSS-G & NComparison 45 (-90")	bits	-1	( ) ________	+1			(bx)
38	Calculate: Line (s) -00009 bits	bits	▨	( ) ________	▨	▨	▨	(by)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 12

JDC
NO. 10073
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (bu) - Line (by) G & N Accuracy BITS 45° (-90")	bits	-1	( ) ________	+1			(bz)
38	Calculate: Line (t) -00.050 deg	deg	▨	( ) ________	▨	▨	▨	(ca)
38	Calculate: Line (bv) - Line (ca) G & N Accuracy CDU 45° (-90")	deg	-.006	( ) ________	+.006			(cb)
35	Calculate: Line (q) - 60 sec	sec	▨	( ) ________	▨	▨	▨	(cc)
35	Convert Line (cc) to VDW Reading using calibration chart	Deg Min	▨	________ ________	▨	▨	▨	(cd)
38	Record AGC display 45° (-60") *	bits R_2 deg	▨	________ ________	▨	▨	▨	(ce)
38	Record 2X TRUNNION CDU indication 45° (-60")	deg	▨	( ) ________	▨	▨	▨	(cf)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 59' 00"	bits	▨	________	▨	▨	▨	(cg)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 12

JDC
NO. 10073
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (ce) - Line (cg) OSS-G&N Comparison 45 (-60")	bits	-1	( ) ________	+1			(ch)
38	Calculate: Line (s) -00006 bits	bits	▨	( ) ________	▨	▨	▨	(ck)
38	Calculate: Line (ce) - Line (ck) G & N Accuracy BITS 45° (-60")	bits	-1	( ) ________	+1			(cm)
38	Calculate: Line (t) -00.033 deg	deg	▨	( ) ________	▨	▨	▨	(cn)
38	Calculate: Line (cf) - Line (cn) G & N Accuracy CDU 45° (-60")	deg	-.006	( ) ________	+.006			(cp)
42	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cq)
43	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cr)
47 50	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(cs)
53	AGC DSKY indication	R_1 deg R_2 deg	▨	________ ________	▨	▨	▨	(ct)

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 12

JDC
NO. 10073
REV. D

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	TRUN DAC slew	sec	0	________	14.0			(cu)
62	Shaft DAC slew	sec	0	________	8.0			(cv)
64	AGC DSKY indication	R_1 deg R_2 deg	▨	________ ________	▨	▨	▨	(cw)
65	Calculate: Line (cw) R_1 - Line (ct) R_1 (SHAFT)	deg	-.02	( ) ________	+.02			(cx)
65	Calculate: Line (cw) R_2 - Line (ct) R_2 (TRUNNION)	deg	-.005	( ) ________	+.005			(cy)
66	Shaft CDU DAC error	mv	0	________	100			(cz)
66	TRUN CDU DAC error	mv	0	________	100			(da)
72	TRUN TPAC	deg	24.43		25.30			(db)
	SHAFT TPAC	deg	179.60		182.40			(dc)
73	SCT TRUNNION angle	deg	24.599		26.247			(de)

DATE ________

JOB OPTICS POSITIONAL ACCURACY TEST | JDC 10073 REV. E PAGE 1 OF 6
INITIAL TDRR 16919 D.S. PGS 2

SUBSYSTEM G & N SYSTEM | ASSY.

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and CDU DAC slew characteristics are checked in this test. In addition, comparison is made with corresponding prelog data.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5-11-65	19030	6	2, 12, 13	WK	TM
B	6-22-65	20268	6	3-5, 7-10	WK	TM
C	7-7-65	20612	4	-	WK	JB
D	7-13-65	20740	-	2	WK	WJR
E	12-7-65	24611	1	-	WK	-

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1025500

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1025500 and Data Sheets 10073, 10609 and 10003.

IMPORTANT: Proceed with this JDC if JDC 10063 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10061, Part III before proceeding with this JDC. For systems 7, 8 and 20 make temporary modifications to this JDC as follows:
a. Disregard all reference to OPTICS HOLD switch. b. In step 1, substitute SEXTANT POWER for OPTICS HOLD switch.

Data from JDC 10003 and JDC 10609 must be transferred to lines (n) (u) (aa) (an) (ay) (bk) (bw) and (cg) of JDC 10073 Data Sheet before proceeding with this JDC.

1. Insure that the G & N MOUNTING FIXTURE is at a tilt angle of zero degrees and that the OPTICS HOLD switch is set to ON.

2. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL. Record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.

3. Set OPTICS HOLD switch to OFF and using the control stick and SHAFT ANGLE CDU thumbwheel, drive the SHAFT ANGLE CDU until the CDU indicates 270°. Set OPTICS HOLD switch to ON.

4. Set the SHAFT ANGLE CDU to 270.000° and the 2X TRUNNION CDU to the angle recorded in step 2a using CDU thumbwheel.

5. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust G & N MOUNTING FIXTURE until horizontal reticle line of SXT is coincident with dot and horizontal reticle line of target #1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 2 MAR 65

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6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.

7. Cover SXT LLOS and repeat step 6 for SXT StLOS recording VDW reading in line (e) of Data Sheet.

8. Complete lines (d) (f) and (g) of Data Sheet.

9. Sight through SCT 1X eyepiece and adjust 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels until central dot on reticle of target #2 is aligned between crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL.

12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeros).

13. Complete lines (p) (q) and (r) of Data Sheet.

14. Place the Variable Deviation Wedge in front of target #1 and repeat steps 3 and 4.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set OPTICS HOLD switch to OFF and using control stick, drive 2X TRUNNION CDU to 90°. Set OPTICS HOLD switch to ON.

19. Using 2X TRUNNION CDU thumbwheel, position SXT StLOS until central dot on reticle of target #3 is aligned to the vertical crosshair on the SXT reticle.

20. Record 2X TRUNNION CDU and AGC display indications in lines (s) and (t) of Data Sheet. Complete lines (w) and (x) of Data Sheet.

21. Set VDW to value recorded in line (x) of Data Sheet.

22. Repeat step 19.

23. Record 2X TRUNNION CDU and AGC display indications in lines (y) and (z) of Data Sheet. Complete lines (ag) and (ah) of Data Sheet.

24. Set VDW to value recorded in line (ah) of Data Sheet.

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25. Repeat step 19.

26. Record 2X TRUNNION CDU and AGC display indications in lines (ak) and (am) of Data Sheet. Complete lines (au) and (av) of Data Sheet.

27. Set VDW to value recorded in line (av) of Data Sheet.

28. Repeat step 19.

29. Record 2X TRUNNION CDU and AGC display indications in lines (aw) and (ax) of Data Sheet. Complete lines (be) and (bf) of Data Sheet.

30. Set VDW to value recorded in line (bf) of Data Sheet.

31. Repeat step 19.

32. Record 2X TRUNNION CDU and AGC display indications in lines (bg) and (bh) of Data Sheet. Complete lines (bs) and (bt) of Data Sheet.

33. Set VDW to value recorded in line (bt) of Data Sheet.

34. Repeat step 19.

35. Record 2X TRUNNION CDU and AGC display indications in lines (bu) and (bv) of Data Sheet. Complete lines (cc) and (cd) of Data Sheet.

36. Set VDW to value recorded in line (cd) of Data Sheet.

37. Repeat step 19.

38. Record 2X TRUNNION CDU and AGC display indications in lines (ce) and (cf) of Data Sheet. Complete lines (v) (ab) (ac) (ad) (ae) (af) (ap) (aq) (ar) (as) (at) (az) (ba) (bb) (bc) (bd) (bm) (bn) (bp) (bq) (br) (bx) (by) (bz) (ca) (cb) (ch) (ck) (cm) (cn) and (cp) of Data Sheet.

39. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL.

40. Set OPTICS HOLD switch to OFF and using the control stick and SHAFT ANGLE CDU thumbwheel, drive the SHAFT ANGLE CDU until the CDU indicates 270°. Set OPTICS HOLD switch to ON.

41. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N MOUNTING FIXTURE cradle.

42. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFFSET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT reticle pattern.

43. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

44. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.

45. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to

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MANUAL.

46. Sight through the SXT StLOS and, using 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, position the approximate center of the SXT StLOS reticle pattern to the number 10 resolution pattern of target #1.

47. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

48. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

49. Sight through the SCT LOS and, using the 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

50. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

51. Set Optics Hold switch on G & N indicator control panel to OFF and set to ZERO OPTICS and, after one minute, return selector to MANUAL.

52. Set the 2X TRUNNION CDU to 90.0° and the SHAFT ANGLE CDU to -90.0° (270°) (do not drive thru 180°). Set OPTICS HOLD switch to ON. Sight through SXT eyepiece and, using control stick and 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, drive the StLOS until the center of the SXT reticle pattern is coincident with the reticle dot of target #3.

53. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. Record indications of rows 1 and 2 of G & N AGC DSKY as r 1 and r 2, respectively, in line (ct) of Data Sheet.

54. Monitor TRUN CDU -Δθ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

55. Set following controls on PRIMARY SIGNAL SELECTOR panel:
COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
DIGITAL RECORDER SELECTOR to CTR.

56. Set following controls on COUNTER:
SAMPLE TIME (N_1) to 002548
CLOCK FREQUENCY DIVIDER to 10
DISPLAY RESET to ZERO
CLOCK SELECTOR to INT
FUNCTION to Ratio or Period
INPUT SELECTOR to C SENSE
SENSE SELECTOR to FWD
ATTEN D to 10 AC
SLOPE to +
TRIGGER VOLTAGE - As required

57. Enter (and verify) VERB 53 NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. Set OPTICS HOLD switch to OFF and set the optics mode selector on G & N indi-

cator control panel to COMPUTER.

58. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

59. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

60. Monitor SHAFT CDU -Δθ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N_1) on COUNTER to 002913.

61. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

62. Enter r 1 from step 53 into G & N AGC DSKY. Press ENTER pushbutton. Enter r 2 from step 53 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder. Set OPTICS HOLD switch to ON.

63. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

64. Sight through SXT eyepiece, the center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as r 1 and r 2, respectively, in line (cw) of Data Sheet.

65. Perform calculations (cx) and (cy) on Data Sheet.

66. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in-phase signals on the PAVM:

a. Shaft CDU DAC Error at 45A8J1 pins 34 (high) and 33 (low)

b. Trunnion CDU DAC Error at 45A8J1 pins 26 (high) and 25 (low)

Record indications in lines (cz) and (da) of Data Sheet.

67. Adjust G & N MOUNTING FIXTURE to approximately 25°.

68. Set OPTICS HOLD switch on G & N indicator control panel to OFF and optics mode selector to ZERO OPTICS and, after one minute, return selector to MANUAL.

69. Using control stick and thumbwheel, drive 2X TRUNNION CDU to 50.000° (±0.10°) and SHAFT ANGLE CDU to 180.000° (±0.10°). Set OPTICS HOLD switch to ON.

70. Sight through SXT eyepiece and insure that horizontal reticle of SXT is coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle.

71. Sight through the SXT eyepiece and, using the 2X TRUNNION CDU thumbwheel,

---

position the SXT StLOS until central dot on reticle of target #1 is coincident with central horizontal reticle line of SXT.

72. Record indication of SCT TRUNNION counter and SHAFT counter as (db) and (dc) on Data Sheet.

73. Sight through the SCT 1X eyepiece and, using the 2X TRUNNION CDU thumbwheel, position the SCT LOS until central dot on reticle of target #2 is coincident with central horizontal reticle line of SCT. Record SCT TRUNNION counter indication in line (de) of Data Sheet.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 12

JDC
NO. 10073
REV. E
INITIAL TDRR 16919

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST
TITLE G & N SYSTEM
SER. NO. ______ DWG ______ REV. ____

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION
APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
2	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ______	+0.006			(a)
2	Record SHAFT CDU indication	deg	-0.006	( ) ______	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min	▨	______ ______	▨	▨	▨	(c)
8	Convert Line (c) to sec. using Calibration Chart	Sec	▨	( ) ______	▨	▨	▨	(d)
6	Record VDW Reading of WSTLOS	Deg Min	▨	______ ______	▨	▨	▨	(e)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 12

JDC
NO. 10073
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
8	Convert Line (e) to sec. using calibration chart	sec	▨	( ) ______	▨	▨	▨	(f)
8	Calculate: Line (f) - Line (d) StLOS-LLOS parallelism	sec	-15	( ) ______	+15			(g)
9	Record 2X TRUNNION CDU indication CDU SCT	deg	▨	( ) ______	▨	▨	▨	(h)
9	Record TRUNNION ANGLE indication TRN	deg	▨	( ) ______	▨	▨	▨	(k)
10	Calculate: Line (h) -Line (a) SCT-SXT parallelism	deg	-0.824	( ) ______	+0.824			(m)

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 **OF** 12

JDC
NO. 10073
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec	▨	____ ____ ____	▨	▨	▨	(n)
13	Calculate: Line 45° - (n) to nearest second	Sec	▨	( ) ____	▨	▨	▨	(p)
13	Calculate: Line (p) + Line (d)	Sec	▨	( ) ____	▨	▨	▨	(q)
13	Convert Line (q) to VDW Reading using calibration chart	Deg Min	▨	____ ____	▨	▨	▨	(r)
20	Record AGC display 45° *	bits R_2 deg	16382	____ __ __ . __ __ __	16386			(s)
20	Record 2X TRUNNION CDU indication 45°	deg	89.990	( ) ____	90.010			(t)
Imp	Transfer Encoder from JDC 10609-B1 45° 0' 0"	bits	▨	____	▨	▨	▨	(u)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE 2 MAR 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 **OF** 12

JDC
NO. 10073
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (s) - Line (u) OSS G & N Comparison 45°	bits	-1	( ) ____	+1			(v)
20	Calculate: Line (q) + 90 sec	sec	▨	( ) ____	▨	▨	▨	(w)
20	Convert Line (w) to VDW Reading using calibration chart	Deg Min	▨	____ ____	▨	▨	▨	(x)
23	Record AGC display 45° (+ 90") *	bits R_2 deg	▨	____ __ __ . __ __ __	▨	▨	▨	(y)
23	Record 2X TRUNNION CDU indication 45° (+ 90")	deg	▨	( ) ____	▨	▨	▨	(z)
Imp	Transfer Encoder from JDC 10609-B1 45° 01' 30"	bits	▨	____	▨	▨	▨	(aa)
38	Calculate: Line (y) - Line (aa) OSS-G&N Comparison 45° (+ 90")	bits	-1	( ) ____	+1			(ab)
38	Calculate: Line (s) + 00009 bits	bits	▨	( ) ____	▨	▨	▨	(ac)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE 2 MAR 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 12

JDC
NO. 10073
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (y) - Line (ac) G & N Accuracy BITS 45° (+ 90")	bits	-1	( ) ____	+1			(ad)
38	Calculate Line (t) + 00.050 deg	deg	▨	( ) ____	▨	▨	▨	(ae)
38	Calculate: Line (z) - Line (ae) G & N Accuracy CDU 45° (+ 90")	deg	-.006	( ) ____	+.006			(af)
23	Calculate: Line (q) + 30 sec	sec	▨	( ) ____	▨	▨	▨	(ag)
23	Convert Line (ag) to VDW Reading using calibration chart	Deg Min	▨	____ ____	▨	▨	▨	(ah)
26	Record AGC display 45° (+ 30")*	bits R_2 deg	▨	____ ____	▨	▨	▨	(ak)
26	Record 2X TRUNNION CDU indication 45° (+ 30")	deg	▨	( ) ____	▨	▨	▨	(am)
Imp	Transfer Encoder Count from JDC 10609-B1 45° 0' 30"	bits	▨	____	▨	▨	▨	(an)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE 2 MAR 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 12

JDC
NO. 10073
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (ak) - Line (an) OSS-G&N Comparison 45° (+ 30")	bits	-1	( ) ____	+1			(ap)
38	Calculate: Line (s) + 00003 bits	bits	▨	( ) ____	▨	▨	▨	(aq)
38	Calculate: Line (ak) - Line (aq) G & N Accuracy BITS 45° (+ 30")	bits	-1	( ) ____	+1			(ar)
38	Calculate: Line (t) + 00.017 deg	deg	▨	( ) ____	▨	▨	▨	(as)
38	Calculate: Line (am) - Line (as) G & N Accuracy CDU 45° (+ 30")	deg	-.006	( ) ____	+.006			(at)
26	Calculate: Line (q) + 60 sec	sec	▨	( ) ____	▨	▨	▨	(au)
26	Convert Line (au) to VDW Reading using calibration chart	Deg Min	▨	____ ____	▨	▨	▨	(av)
29	Record AGC display 45° (+ 60")*	bits R_2 deg	▨	____ ____	▨	▨	▨	(aw)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE 2 MAR 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 12

JDC
NO. 10073
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Record 2X TRUNNION CDU indication 45° (+60")	deg		( ) ______				(ax)
Imp	Transfer Encoder Count from JDC 10609-B1 45° 01' 00"	bits		______				(ay)
38	Calculate: Line (aw) - Line (ay) OSS-G&N Comparison 45° (+60")	bits	-1	( ) ______	+1			(az)
38	Calculate: Line (s) +00006 bits	bits		( ) ______				(ba)
38	Calculate: Line (aw) - Line (ba) G & N Accuracy BITS 45° (+60")	bits	-1	( ) ______	+1			(bb)
38	Calculate: Line (t) +00.033 deg	deg		( ) ______				(bc)
38	Calculate: Line (ax) - Line (bc) G & N Accuracy CDU 45° (+60")	deg	-.006	( ) ______	+.006			(bd)
29	Calculate: Line (q) - 30 sec	sec		( ) ______				(be)

DATE 2 MAR 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 12

JDC
NO. 10073
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Convert Line (be) to VDW Reading using calibration chart	Deg Min		______ ______				(bf)
32	Record AGC display 45° (-30") *	bits R_2 deg		______ ______				(bg)
32	Record 2X TRUNNION CDU indication 45° (-30")	deg		( ) ______				(bh)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 59' 30"	bits		______				(bk)
38	Calculate: Line (bg) - Line (bk) OSS- G&N Comparison 45° (-30")	bits	-1	( ) ______	+1			(bm)
38	Calculate: Line (s) -00003 bits	bits		( ) ______				(bn)
38	Calculate: Line (bg) - Line (bn) G & N Accuracy BITS 45° (-30")	bits	-1	( ) ______	+1			(bp)
38	Calculate: Line (t) -00.017 deg	deg		( ) ______				(bq)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE 2 MAR 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 12

JDC
NO. 10073
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (bh) - Line (bq) G & N Accuracy CDU 45° (-30")	deg	-.006	( ) ______	+.006			(br)
32	Calculate: Line (q) - 90 sec	sec		( ) ______				(bs)
32	Convert Line (bs) to VDW Reading using ca' chart	Deg Min		______ ______				(bt)
35	Re	bits R_2 deg		______ ______				(bu)
35	Re TRUNNION C ndication 45° (")	deg		( ) ______				(bv)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 58' 30"	bits		______				(bw)
38	Calculate: Line (bu) - Line (bw) OSS-G & NComparison 45° (-90")	bits	-1	( ) ______	+1			(bx)
38	Calculate: Line (s) -00009 bits	bits		( ) ______				(by)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE 2 MAR 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 12

JDC
NO. 10073
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (bu) - Line (by) G & N Accuracy BITS 45° (-90")	bits	-1	( ) ______	+1			(bz)
38	Calculate: Line (t) -00.050 deg	deg		( ) ______				(ca)
38	Calculate: Line (bv) - Line (ca) G & N Accuracy CDU 45° (-90")	deg	-.006	( ) ______	+.006			(cb)
35	Calculate: Line (q) - 60 sec	sec		( ) ______				(cc)
35	Convert Line (cc) to VDW Reading using calibration chart	Deg Min		______ ______				(cd)
38	Record AGC display 45° (-60") *	bits R_2 deg		______ ______				(ce)
38	Record 2X TRUNNION CDU indication 45° (-60")	deg		( ) ______				(cf)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 59' 00"	bits		______				(cg)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

DATE 2 MAR 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 12

JDC
NO. 10073
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (ce) - Line (cg) OSS-G&N Comparison 45° (-60")	bits	-1	( ) ______	+1			(ch)
38	Calculate: Line (s) -00006 bits	bits	▨	( ) ______	▨	▨	▨	(ck)
38	Calculate: Line (ce) - Line (ck) G & N Accuracy BITS 45° (-60")	bits	-1	( ) ______	+1			(cm)
38	Calculate: Line (t) -00.033 deg	deg	▨	( ) ______	▨	▨	▨	(cn)
38	Calculate: Line (cf) - Line (cn) G & N Accuracy CDU 45° (-60")	deg	-.006	( ) ______	+.006			(cp)
42	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cq)
43	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cr)
47 50	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(cs)
53	AGC DSKY indication	R_1 deg R_2 deg	▨	______ ______	▨	▨	▨	(ct)

DATE 2 MAR 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 12

JDC
NO. 10073
REV. E

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	TRUN DAC slew	sec	0	______	14.0			(cu)
62	Shaft DAC slew	sec	0	______	8.0			(cv)
64	AGC DSKY indication	R_1 deg R_2 deg	▨	______ ______	▨	▨	▨	(cw)
65	Calculate: Line (cw) R_1 - Line (ct) R_1 (SHAFT)	deg	-.02	( ) ______	+.02			(cx)
65	Calculate: Line (cw) R_2 - Line (ct) R_2 (TRUNNION)	deg	-.005	( ) ______	+.005			(cy)
66	Shaft CDU DAC error	mv	0	______	100			(cz)
66	TRUN CDU DAC error	mv	0	______	100			(da)
72	TRUN TPAC	deg	24.43		25.30			(db)
	SHAFT TPAC	deg	179.60		182.40			(dc)
73	SCT TRUNNION angle	deg	24.599		26.247			(de)

DATE 2 MAR 65

JOB OPTICS POSITIONAL ACCURACY TEST | JDC 10073 REV. F PAGE 1 OF 6
INITIAL TDRR 16919 D.S. PGS 12

SUBSYSTEM G & N SYSTEM | **ASSY.**

DESCRIPTION SXT LOS parallelism, SXT-SCT LOS parallelism, SXT StLOS positional accuracy, SCT and CDU DAC slew characteristics are checked in this test. In addition, comparison is made with corresponding prelog data.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	5-11-65	19030	6	2, 12, 13	WK	TM
B	6-22-65	20268	6	3-5, 7-10	WK	TM
Ⓜ C	7-7-65	20612	4	-	WK	JB
D	7-13-65	20740	-	2	WK	WJR
E	12-7-65	24611	1	-	WK	-
F	1-18-66	25344	-	4, 6-9, 11	WK	-

REFERENCES Paragraphs 3-3.10 and 3-3.4.4.3 of ATP 1025500

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1025500 and Data Sheets 10073, 10609 and 10003.

IMPORTANT: Proceed with this JDC if JDC 10063 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10061, Part III before proceeding with this JDC. For systems 7, 8 and 20 make temporary modifications to this JDC as follows:
a. Disregard all reference to OPTICS HOLD switch. b. In step 1, substitute SEXTANT POWER for OPTICS HOLD switch.

Data from JDC 10003 and JDC 10609 must be transferred to lines (n) (u) (aa) (an) (ay) (bk) (bw) and (cg) of JDC 10073 Data Sheet before proceeding with this JDC.

1. Insure that the G & N MOUNTING FIXTURE is at a tilt angle of zero degrees and that the OPTICS HOLD switch is set to ON.

2. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL. Record 2X TRUNNION CDU and SHAFT ANGLE CDU indications in lines (a) and (b) of Data Sheet.

3. Set OPTICS HOLD switch to OFF and using the control stick and SHAFT ANGLE CDU thumbwheel, drive the SHAFT ANGLE CDU until the CDU indicates 270°. Set OPTICS HOLD switch to ON.

4. Set the SHAFT ANGLE CDU to 270.000° and the 2X TRUNNION CDU to the angle recorded in step 2a using CDU thumbwheel.

5. Place Variable Deviation Wedge (VDW) in front of target #1 and set VDW dial to zero. Sight through SXT LLOS and adjust G & N MOUNTING FIXTURE until horizontal reticle line of SXT is coincident with dot and horizontal reticle line of target #1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 2 MAR 65

JOB OPTICS POSITIONAL ACCURACY TEST | JDC 10073 REV F PAGE 2 OF 6

SUBSYSTEM G & N SYSTEM | **ASSY**

6. Cover SXT StLOS and sight through SXT LLOS and move VDW laterally until target #1 reticle is seen clearly. Adjust VDW dial until central vertical reticle line of SXT is coincident with dot and vertical reticle line of target #1. Record dial reading of VDW in line (c) of Data Sheet. Uncover StLOS.

7. Cover SXT LLOS and repeat step 6 for SXT StLOS recording VDW reading in line (e) of Data Sheet.

8. Complete lines (d) (f) and (g) of Data Sheet.

9. Sight through SCT 1X eyepiece and adjust 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels until central dot on reticle of target #2 is aligned between crosshairs on SCT reticle. Record 2X TRUNNION CDU indication in line (h) of Data Sheet. Record TRUNNION ANGLE, indicated on Optics head, as TRN in line (k) of Data Sheet.

10. Complete line (m) of Data Sheet.

11. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL.

12. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The AGC display indicates the contents of AGC shaft and trunnion CDU counters. (The AGC display shall indicate all zeros).

13. Complete lines (p) (q) and (r) of Data Sheet.

14. Place the Variable Deviation Wedge in front of target #1 and repeat steps 3 and 4.

15. Set VDW to value recorded in line (c) of Data Sheet. Sight through the SXT LLOS eyepiece and insure that the SXT vertical reticle line and target #1 reticle dot (or vertical reticle line) are coincident.

16. Place Variable Deviation Wedge in front of target #3 and cover target #1.

17. Set VDW to value recorded in line (r) of Data Sheet.

18. Set OPTICS HOLD switch to OFF and using control stick, drive 2X TRUNNION CDU to 90°. Set OPTICS HOLD switch to ON.

19. Using 2X TRUNNION CDU thumbwheel, position SXT StLOS until central dot on reticle of target #3 is aligned to the vertical crosshair on the SXT reticle.

20. Record 2X TRUNNION CDU and AGC display indications in lines (s) and (t) of Data Sheet. Complete lines (w) and (x) of Data Sheet.

21. Set VDW to value recorded in line (x) of Data Sheet.

22. Repeat step 19.

23. Record 2X TRUNNION CDU and AGC display indications in lines (y) and (z) of Data Sheet. Complete lines (ag) and (ah) of Data Sheet.

24. Set VDW to value recorded in line (ah) of Data Sheet.

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JOB OPTICS POSITIONAL ACCURACY TEST | JDC 10073 REV F PAGE 3 OF 6

SUBSYSTEM G & N SYSTEM | **ASSY**

25. Repeat step 19.

26. Record 2X TRUNNION CDU and AGC display indications in lines (ak) and (am) of Data Sheet. Complete lines (au) and (av) of Data Sheet.

27. Set VDW to value recorded in line (av) of Data Sheet.

28. Repeat step 19.

29. Record 2X TRUNNION CDU and AGC display indications in lines (aw) and (ax) of Data Sheet. Complete lines (be) and (bf) of Data Sheet.

30. Set VDW to value recorded in line (bf) of Data Sheet.

31. Repeat step 19.

32. Record 2X TRUNNION CDU and AGC display indications in lines (bg) and (bh) of Data Sheet. Complete lines (bs) and (bt) of Data Sheet.

33. Set VDW to value recorded in line (bt) of Data Sheet.

34. Repeat step 19.

35. Record 2X TRUNNION CDU and AGC display indications in lines (bu) and (bv) of Data Sheet. Complete lines (cc) and (cd) of Data Sheet.

36. Set VDW to value recorded in line (cd) of Data Sheet.

37. Repeat step 19.

38. Record 2X TRUNNION CDU and AGC display indications in lines (ce) and (cf) of Data Sheet. Complete lines (v) (ab) (ac) (ad) (ae) (af) (ap) (aq) (ar) (as) (at) (az) (ba) (bb) (bc) (bd) (bm) (bn) (bp) (bq) (br) (bx) (by) (bz) (ca) (cb) (ch) (ck) (cm) (cn) and (cp) of Data Sheet.

39. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL.

40. Set OPTICS HOLD switch to OFF and using the control stick and SHAFT ANGLE CDU thumbwheel, drive the SHAFT ANGLE CDU until the CDU indicates 270°. Set OPTICS HOLD switch to ON.

41. Insure that horizontal reticle line of SCT is coincident with horizontal reticle line of target #2 by adjusting G & N MOUNTING FIXTURE cradle.

42. Set SLAVE TELESCOPE switch on G & N indicator control panel to OFFSET 25°. The target #2 reticle pattern shall appear to intersect the number 0 on the SCT reticle pattern.

43. Set SLAVE TELESCOPE switch on G & N indicator control panel to LANDMARK LOS 0°. The target #2 reticle pattern shall appear to intersect the center of the SCT reticle pattern.

44. Set SLAVE TELESCOPE switch on G & N indicator control panel to STAR LOS.

45. Set optics mode selector on G & N indicator control panel to ZERO OPTICS and, after one minute, return selector to MANUAL.

DATE 2 MAR 65

JOB OPTICS POSITIONAL ACCURACY TEST | JDC 10073 REV F PAGE 4 OF 6

SUBSYSTEM G & N SYSTEM | **ASSY**

46. Sight through the SXT StLOS and, using 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, position the approximate center of the SXT StLOS reticle pattern to the number 10 resolution pattern of target #1.

47. Sight through StLOS and LLOS and observe the number 10 and surrounding lines on target #1 reticle. The number 10 and surrounding lines shall be clear and distinct.

48. Position the SCT resolution card approximately 10 feet from the SCT trunnion axis.

49. Sight through the SCT LOS and, using the 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, position the approximate center of the SCT LOS reticle pattern to the 3 min. resolution pattern of the resolution card.

50. Sight through SCT and observe the number and surrounding lines on the resolution card. The number and surrounding lines shall be clear and distinct.

51. Set Optics Hold switch on G & N indicator control panel to OFF and set to ZERO OPTICS and, after one minute, return selector to MANUAL.

52. Set the 2X TRUNNION CDU to 90.0° and the SHAFT ANGLE CDU to -90.0° (270°) (do not drive thru 180°). Set OPTICS HOLD switch to ON. Sight through SXT eyepiece and, using control stick and 2X TRUNNION CDU and SHAFT ANGLE CDU thumbwheels, drive the StLOS until the center of the SXT reticle pattern is coincident with the reticle dot of target #3.

53. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. Record indications of rows 1 and 2 of G & N AGC DSKY as r 1 and r 2, respectively, in line (ct) of Data Sheet.

54. Monitor TRUN CDU $-\Delta\theta$ on PSA Adapter at 45A7J1 pins 6 (high) and 13 (low) using pulse probe.

55. Set following controls on PRIMARY SIGNAL SELECTOR panel:
COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton -"D" PULSE indicator lighted
DIGITAL RECORDER SELECTOR to CTR.

56. Set following controls on COUNTER:
SAMPLE TIME (N_1) to 002548
CLOCK FREQUENCY DIVIDER to 10
DISPLAY RESET to ZERO
CLOCK SELECTOR to INT
FUNCTION to Ratio or Period
INPUT SELECTOR to C SENSE
SENSE SELECTOR to FWD
ATTEN D to 10 AC
SLOPE to +
TRIGGER VOLTAGE - As required

57. Enter (and verify) VERB 53 NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. Set OPTICS HOLD switch to OFF and set the optics mode selector on G & N indi-

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cator control panel to COMPUTER.

58. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

59. Enter +00000 into row 1 of G & N AGC DSKY; press ENTER pushbutton. Enter +00000 into row 2 of G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder.

60. Monitor SHAFT CDU -Δθ on PSA Adapter at 45A7J1 pins 4 (high) and 12 (low) using pulse probe. Set SAMPLE TIME (N_1) on COUNTER to 002913.

61. Enter (and verify) VERB 41, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate VERB 21, NOUN 57.

62. Enter r 1 from step 53 into G & N AGC DSKY. Press ENTER pushbutton. Enter r 2 from step 53 into G & N AGC DSKY. DO NOT press ENTER. Press RESET button on COUNTER. NOW press ENTER pushbutton. Record the second printout of the digital recorder. Set OPTICS HOLD switch to ON.

63. Enter (and verify) VERB 16, NOUN 55 into G & N AGC DSKY. Press ENTER pushbutton.

64. Sight through SXT eyepiece, the center of SXT reticle shall be coincident with or touching the image of the reticle dot of target #3. Record indications of rows 1 and 2 of G & N AGC DSKY as r 1 and r 2, respectively, in line (cw) of Data Sheet.

65. Perform calculations (cx) and (cy) on Data Sheet.

66. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR panel to 199. Use ac probes to measure the following in-phase signals on the PAVM:

a. Shaft CDU DAC Error at 45A8J1 pins 34 (high) and 33 (low)

b. Trunnion CDU DAC Error at 45A8J1 pins 26 (high) and 25 (low)

Record indications in lines (cz) and (da) of Data Sheet.

67. Adjust G & N MOUNTING FIXTURE to approximately 25°.

68. Set OPTICS HOLD switch on G & N indicator control panel to OFF and optics mode selector to ZERO OPTICS and, after one minute, return selector to MANUAL.

69. Using control stick and thumbwheel, drive 2X TRUNNION CDU to 50.000° (±0.10°) and SHAFT ANGLE CDU to 180.000° (±0.10°). Set OPTICS HOLD switch to ON.

70. Sight through SXT eyepiece and insure that horizontal reticle of SXT is coincident with horizontal reticle line of target #1 by adjusting G & N Mounting Fixture cradle.

71. Sight through the SXT eyepiece and, using the 2X TRUNNION CDU thumbwheel,

position the SXT StLOS until central dot on reticle of target #1 is coincident with central horizontal reticle line of SXT.

72. Record indication of SCT TRUNNION counter and SHAFT counter as (db) and (dc) on Data Sheet.

73. Sight through the SCT 1X eyepiece and, using the 2X TRUNNION CDU thumbwheel, position the SCT LOS until central dot on reticle of target #2 is coincident with central horizontal reticle line of SCT. Record SCT TRUNNION counter indication in line (de) of Data Sheet.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 12

JDC
NO. 10073
REV. F
INITIAL TDRR 16919

JOB OPTICS POSITIONAL ACCURACY TEST

ASSEMBLY UNDER TEST
TITLE G & N SYSTEM
SER. NO. ______ DWG ______ REV. ___

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ ______ CAL DATE
NAME ______ SER. NO. ______ ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
2	Record 2X TRUNNION CDU indication	deg	-0.006	( ) ______	+0.006			(a)
2	Record SHAFT CDU indication	deg	-0.006	( ) ______	+0.006			(b)
6	Record VDW Reading of WLLOS	Deg Min	▨	______ ______	▨	▨	▨	(c)
8	Convert Line (c) to sec. using Calibration Chart	Sec	▨	( ) ______	▨	▨	▨	(d)
6	Record VDW Reading of WSTLOS	Deg Min	▨	______ ______	▨	▨	▨	(e)

NOTE: VDW reading decreasing from 360° indicates (+) angle (seconds)
VDW reading increasing from 0° indicates (-) angle (seconds)

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 12

JDC
NO. 10073
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
8	Convert Line (e) to sec. using calibration chart	sec	▨	( ) ______	▨	▨	▨	(f)
8	Calculate: Line (f) - Line (d) StLOS-LLOS parallelism	sec	-15	( ) ______	+15			(g)
9	Record 2X TRUNNION CDU indication CDU SCT	deg	▨	( ) ______	▨	▨	▨	(h)
9	Record TRUNNION ANGLE indication TRN	deg	▨	( ) ______	▨	▨	▨	(k)
10	Calculate: Line (h) - Line (a) SCT-SXT parallelism	deg	-0.824	( ) ______	+0.824			(m)

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 **OF** 12

JDC
NO. 10073
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
Imp	Transfer target calibration angle ϕ_3 from JDC 10003 Item C.1 to nearest whole second	Deg Min Sec		______ ______ ______				(n)
13	Calculate: Line 45° - (n) to nearest second	Sec		( ) ______				(p)
13	Calculate: Line (p) + Line (d)	Sec		( ) ______				(q)
13	Convert Line (q) to VDW Reading using calibration chart	Deg Min		______ ______				(r)
20	Record AGC display 45° *	bits R_2 deg	16382	______ __ — __ — __	16386			(s)
20	Record 2X TRUNNION CDU indication 45°	deg	89.990	( ) ______	90.010			(t)
Imp	Transfer Encoder from JDC 10609-B1 45° 0' 0"	bits		______				(u)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 **OF** 12

JDC
NO. 10073
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (s) - Line (u) OSS G & N Comparison 45°	bits		( ) ______				(v)
20	Calculate: Line (q) + 90 sec	sec		( ) ______				(w)
20	Convert Line (w) to VDW Reading using calibration chart	Deg Min		______ ______				(x)
23	Record AGC display 45° (+ 90") *	bits R_2 deg		______ __ — __ — __				(y)
23	Record 2X TRUNNION CDU indication 45° (+ 90")	deg		( ) ______				(z)
Imp	Transfer Encoder from JDC 10609-B1 45° 01' 30"	bits		______				(aa)
38	Calculate: Line (y) - Line (aa) OSS-G&N Comparison 45° (+ 90")	bits		( ) ______				(ab)
38	Calculate: Line (s) + 00009 bits	bits		( ) ______				(ac)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 12

JDC
NO. 10073
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (y) - Line (ac) G & N Accuracy BITS 45° (+ 90")	bits	-1	( ) ______	+1			(ad)
38	Calculate Line (t) + 00.050 deg	deg		( ) ______				(ae)
38	Calculate: Line (z) - Line (ae) G & N Accuracy CDU 45° (+ 90")	deg	-.006	( ) ______	+.006			(af)
23	Calculate: Line (q) + 30 sec	sec		( ) ______				(ag)
23	Convert Line (ag) to VDW Reading using calibration chart	Deg Min		______ ______				(ah)
26	Record AGC display 45° (+ 30")*	bits R_2 deg		______ ______				(ak)
26	Record 2X TRUNNION CDU indication 45° (+ 30")	deg		( ) ______				(am)
Imp	Transfer Encoder Count from JDC 10609-B1 45° 0' 30"	bits		______				(an)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 12

JDC
NO. 10073
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (ak) - Line (an) OSS-G&N Comparison 45° (+ 30")	bits		( ) ______				(ap)
38	Calculate: Line (s) + 00003 bits	bits		( ) ______				(aq)
38	Calculate: Line (ak) - Line (aq) G & N Accuracy BITS 45° (+ 30")	bits	-1	( ) ______	+1			(ar)
38	Calculate: Line (t) + 00.017 deg	deg		( ) ______				(as)
38	Calculate: Line (am) - Line (as) G & N Accuracy CDU 45° (+ 30")	deg	-.006	( ) ______	+.006			(at)
26	Calculate: Line (q) + 60 sec	sec		( ) ______				(au)
26	Convert Line (au) to VDW Reading using calibration chart	Deg Min		______ ______				(av)
29	Record AGC display 45° (+ 60")*	bits R_2 deg		______ ______				(aw)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 12

JDC
NO. 10073
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Record 2X TRUNNION CDU indication 45° (+60")	deg	▨	( ) ______	▨	▨	▨	(ax)
Imp	Transfer Encoder Count from JDC 10609-B1 45° 01' 00"	bits	▨	______	▨	▨	▨	(ay)
38	Calculate: Line (aw) - Line (ay) OSS-G&N Comparison 45° (+60")	bits	▨	( ) ______	▨	▨	▨	(az)
38	Calculate: Line (s) +00006 bits	bits	▨	( ) ______	▨	▨	▨	(ba)
38	Calculate: Line (aw) - Line (ba) G & N Accuracy BITS 45° (+60")	bits	-1	( ) ______	+1			(bb)
38	Calculate: Line (t) +00.033 deg	deg	▨	( ) ______	▨	▨	▨	(bc)
38	Calculate: Line (ax) - Line (bc) G & N Accuracy CDU 45° (+60")	deg	-.006	( ) ______	+.006			(bd)
29	Calculate: Line (q) - 30 sec	sec	▨	( ) ______	▨	▨	▨	(be)

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 12

JDC
NO. 10073
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
29	Convert Line (be) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(bf)
32	Record AGC display 45° (-30") *	bits R_2 deg	▨	______ ______	▨	▨	▨	(bg)
32	Record 2X TRUNNION CDU indication 45° (-30")	deg	▨	( ) ______	▨	▨	▨	(bh)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 59' 30"	bits	▨	______	▨	▨	▨	(bk)
38	Calculate: Line (bg) - Line (bk) OSS- G&N Comparison 45° (-30")	bits	▨	( ) ______	▨	▨	▨	(bm)
38	Calculate: Line (s) -00003 bits	bits	▨	( ) ______	▨	▨	▨	(bn)
38	Calculate: Line (bg) - Line (bn) G & N Accuracy BITS 45° (-30")	bits	-1	( ) ______	+1			(bp)
38	Calculate: Line (t) -00.017 deg	deg	▨	( ) ______	▨	▨	▨	(bq)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 OF 12

JDC
NO. 10073
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (bh) - Line (bq) G & N Accuracy CDU 45° (-30")	deg	-.006	( ) ______	+.006			(br)
32	Calculate: Line (q) - 90 sec	sec	▨	( ) ______	▨	▨	▨	(bs)
32	Convert Line (bs) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(bt)
35	Record AGC display 45° (-90")*	bits R_2 deg	▨	______ ______	▨	▨	▨	(bu)
35	Record 2X TRUNNION CDU indication 45° (-90")	deg	▨	( ) ______	▨	▨	▨	(bv)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 58' 30"	bits	▨	______	▨	▨	▨	(bw)
38	Calculate: Line (bu) - Line (bw) OSS-G & NComparison 45° (-90")	bits	▨	( ) ______	▨	▨	▨	(bx)
38	Calculate: Line (s) -00009 bits	bits	▨	( ) ______	▨	▨	▨	(by)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 OF 12

JDC
NO. 10073
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (bu) - Line (by) G & N Accuracy BITS 45° (-90")	bits	-1	( ) ______	+1			(bz)
38	Calculate: Line (t) -00.050 deg	deg	▨	( ) ______	▨	▨	▨	(ca)
38	Calculate: Line (bv) - Line (ca) G & N Accuracy CDU 45° (-90")	deg	-.006	( ) ______	+.006			(cb)
35	Calculate: Line (q) - 60 sec	sec	▨	( ) ______	▨	▨	▨	(cc)
35	Convert Line (cc) to VDW Reading using calibration chart	Deg Min	▨	______ ______	▨	▨	▨	(cd)
38	Record AGC display 45° (-60") *	bits R_2 deg	▨	______ ______	▨	▨	▨	(ce)
38	Record 2X TRUNNION CDU indication 45° (-60")	deg	▨	( ) ______	▨	▨	▨	(cf)
Imp	Transfer Encoder Count from JDC 10609-B1 44° 59' 00"	bits	▨	______	▨	▨	▨	(cg)

*Multiply AGC DSKY R_2 x 364.09 to convert to bits.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 12

JDC
NO. 10073
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
38	Calculate: Line (ce) - Line (cg) OSS-G&N Comparison 45° (-60")	bits	▨	( ) ________	▨	▨	▨	(ch)
38	Calculate: Line (s) -00006 bits	bits	▨	( ) ________	▨	▨	▨	(ck)
38	Calculate: Line (ce) - Line (ck) G & N Accuracy BITS 45° (-60")	bits	-1	( ) ________	+1			(cm)
38	Calculate: Line (t) -00.033 deg	deg	▨	( ) ________	▨	▨	▨	(cn)
38	Calculate: Line (cf) - Line (cn) G & N Accuracy CDU 45° (-60")	deg	-.006	( ) ________	+.006			(cp)
42	SCT (OFFSET 25°)		▨	Reacted as Specified	▨			(cq)
43	SCT Comparison (Offset 0°)		▨	Reacted as Specified	▨			(cr)
47 50	IMAGE RESOLUTION		▨	Clear and Distinct	▨			(cs)
53	AGC DSKY indication	R_1 deg R_2 deg	▨	________ ________	▨	▨	▨	(ct)

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 12

JDC
NO. 10073
REV. F

JOB OPTICS POSITIONAL ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
59	TRUN DAC slew	sec	0	________	14.0			(cu)
62	Shaft DAC slew	sec	0	________	8.0			(cv)
64	AGC DSKY indication	R_1 deg R_2 deg	▨	________ ________	▨	▨	▨	(cw)
65	Calculate: Line (cw) R_1 - Line (ct) R_1 (SHAFT)	deg	-.02	( ) ________	+.02			(cx)
65	Calculate: Line (cw) R_2 - Line (ct) R_2 (TRUNNION)	deg	-.005	( ) ________	+.005			(cy)
66	Shaft CDU DAC error	mv	0	________	100			(cz)
66	TRUN CDU DAC error	mv	0	________	100			(da)
72	TRUN TPAC	deg	24.43		25.30			(db)
	SHAFT TPAC	deg	179.60		182.40			(dc)
73	SCT TRUNNION angle	deg	24.599		26.247			(de)

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JOB AGC MODE CONTROL TEST

JDC 10084 REV. A PAGE 1 OF 17
INITIAL TDRR 21539 D.S. PGS 6

SUBSYSTEM G AND N SYSTEM

ASSY.

DESCRIPTION The G and N System is sequenced through its operating modes using the computer to initialize each mode. Visual displays of the modes are verified on IMU CONTROL panel and AGC display of mode register 3 as well as spacecraft, PSA front panel and telemetry interface.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-21-65	22662	12, 16	-	WK *fcl*	ACM *m*

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.3.1, 3-3.4.3.3, 3-3.8 2.1, 3-3.11.1.6 through 3-3.11.1.10, 3-3.11.2.62, 3-3.11.3.66, 3-3.11.2.67, 3-3.11.2.121 and 3-3.11.3.43 through 3-3.11.51, 3-3.11.2.82 through 3-3.11.2.84, 3-3.11.2.87 through 3-3.11.2.91, and 3-3.11.3.68 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. Those signals listed on the Data Sheet which are starred (**) must be corrected by the multiplication factor found on the signal identification drawings 1902141-003 or 1902141-004 to obtain the true value.

1. Tilt G and N Mounting Fixture 32.5 ± 0.5 degrees.

2. Insure that TRANSFER switch on IMU CONTROL panel is set to COMPUTER.

3. Insure that TRACKER POWER switch on G and N indicator control panel is set to OFF and optics mode selector is set to MANUAL.

4. Set following switches on PRIMARY SIGNAL SELECTOR panel:

COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton - "D" PULSE lighted

5. Set switches and controls on COUNTER as follows:

SAMPLE TIME (N_1) to 002048

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB AGC MODE CONTROL TEST

JDC 10084 REV A PAGE 2 OF 17

SUBSYSTEM G AND N SYSTEM

ASSY

CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to RATIO OR PERIOD
INPUT SELECTOR to C SENSE
SENSE SELECTOR to FWD
ATTN D to 10AC
SLOPE to +
TRIGGER VOLTAGE as required

NOTE: Read and understand steps 6 through 10 before proceeding. Perform steps 7 through 10 within 40 seconds after initiating step 6.

6. Enter (and verify) VERB 40, NOUN 20 (ZERO ENC mode) into G and N AGC DSKY. Press ENTER pushbutton. (The ZERO ENC, FINE ALIGN, ATT CONT and FINE ALIGN mode lamps on IMU CONTROL panel shall light in sequence stated above.) The ZERO ENCODER condition lamp shall remain lighted for approximately 20 seconds after the system enters the final FINE ALIGN mode of the sequence indicated above.

7. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

8. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate the contents of mode register 3 in row 1 as 50051.

9. The OUTER GIMBAL, MIDDLE GIMBAL and INNER GIMBAL CDU's shall indicate 0.000 (±0.006°). Record.

10. Enter (and verify) VERB 15, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display shall indicate the contents of X, Y and Z CDU counters in rows 1, 2 and 3 as all zeros prior to entering the first FINE ALIGN mode of the sequence stated in step 6.

NOTE: If rows 1, 2 and 3 do not each indicate 00000, repeat steps 6 and 10 once after the ZERO ENCODER light goes out. If they again do not indicate 00000, the system has failed the test.

11. Enter (and verify) VERB 41, NOUN 20 into G & N AGC DSKY. Press ENTER pushbutton; the VERB-NOUN display shall flash and indicate 21-22.

12. Enter +00000 into G and N AGC DSKY three times pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing after pressing ENTER pushbutton the third time and the COARS ALIGN lamp on the IMU CONTROL panel shall light and the FINE ALIGN lamp shall go out.

13. Monitor IG + Δθ pulses at 45A5J1, pins 23 (high) and 1 (low) using pulse probes on PSA Adapter.

14. Enter (and verify) VERB 25, NOUN 22 into the G and N AGC DSKY. Press ENTER

DATE ______

JOB AGC MODE CONTROL TEST

JDC 10084 REV A PAGE 3 OF 17

SUBSYSTEM G AND N SYSTEM

ASSY

pushbutton. VERB-NOUN display shall flash and indicate 21-22.

15. Enter +06000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

16. Enter +06000 into G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record second printout of the DIGITAL RECORDER.

NOTE: The GIMBAL LOCK lamps on the Condition Annunciator and MONITOR panel may light. Disregard these lamp indications unless specifically indicated to do otherwise.

17. Monitor MG -Δθ pulses at 45A5J1 pins 32 (high) and 1 (low) using pulse probes on PSA Adapter.

18. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

19. Enter +00000 into G and N AGC DSKY twice pressing the ENTER pushbutton after each entry.

20. Enter +00000 into the G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record the second printout of the DIGITAL RECORDER.

21. Monitor OG + Δθ pulses at 45A5J1, pins 25 (high) and 1 (low) using pulse probes on PSA Adapter.

22. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

23. Enter +06000 into G and N AGC DSKY. Press ENTER pushbutton.

24. Enter +06000 into G and N AGC DSKY. Press the ENTER pushbutton.

25. Enter +06000 into the G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record the second printout of the DIGITAL RECORDER.

26. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

27. Enter address 00007_8 into G& N AGC DSKY. Press ENTER pushbutton. AGC DSKY shall indicate the contents of mode register 3 in row 1 as 50042.

28. Record the IMU-CDU DIFFERENCE meter indications.

29. Measure in phase voltage of the following signals on the PAVM using CROSSBAR CONTROL setting indicated for each signal: (CROSSBAR CONTROL is located on PRIMARY SIGNAL SELECTOR.

DATE ______

JOB AGC MODE CONTROL TEST

JDC 10084 REV A PAGE 4 OF 17

SUBSYSTEM G AND N SYSTEM

ASSY

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IG CDU 1X error	232	56P9 pins 59 (high) and 41 (low)
b. MG CDU 1X error	231	56P9 pins 60 (high) and 43 (low)
c. OG CDU 1X error	230	56P9 pins 77 (high) and 61 (low)
d. IGA 1X sine	144	56P9 pins 1 (S2) and 23 (S4)
e. IGA 1X cosine	243	56P9 pins 2(S1) and 3 (S3)
f. MGA 1X sine	143	56P9 pins 24 (S2) and 42 (S4)
g. MGA 1X cosine	242	56P9 pins 25 (S1) and 44 (S3)
h. OGA 1X sine	142	56P9 pins 4 (S2) and 26 (S4)
i. OGA 1X cosine	241	56P9 pins 45 (S1) and 27 (S3)

30. Measure the phase angle of the following signals with respect to 800~ demod. reference on the PAVM by using the CROSSBAR CONTROL setting indicated for each signal.

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IGA 1X sine	144	56P9 pins 1 (S2) and 23 (S4)
b. MGA 1X sine	143	56P9 pins 24 (S2) and 42 (S4)
c. OGA 1X sine	142	56P9 pins 4 (S2) and 26 (S4)
d. IGA 1X cosine	243	56P9 pins 2 (S1) and 3 (S3)
e. MGA 1X cosine	242	56P9 pins 25 (S1) and 44 (S3)
f. OGA 1X cosine	241	56P9 pins 45 (S1) and 27 (S3)

Record indications.

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31. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY.

32. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

33. Enter + 00000 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing.

34. Enter (and verify) VERB 42 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

35. Enter (and verify) VERB 33. Press ENTER pushbutton. The VERB-NOUN display shall stop flashing and indicate 42-67. The FINE ALIGN mode lamp on the IMU CONTROL panel shall be the only lamp that lights.

36. Monitor in-phase voltage of the following signals on the PAVM using CROSSBAR CONTROL setting indicated for each signal:

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IG CDU 16X error	229	45A6J1 pins 20 (high) and 21 (low)
b. MG CDU 16X error	228	45A6J1 pins 27 (high) and 28 (low)
c. OG CDU 16X error	227	45A6J1 pins 35 (high) and 36 (low)

Record indications.

37. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

38. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate the contents of mode register 3 in row 1 as 50050.

39. Insure that the SCS LOADS ENTRY pushbutton on the TEST CONTROL panel is lighted.

40. Set CROSSBAR CONTROL to 99 and VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

41. Calibrate the PAVM with FREQUENCY control set to 800 ~ #2. Set controls as follows:

FUNCTION to 0°
DEGREES to 0°

42. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton (the ZERO ENC, FINE ALIGN, ATT CONT and FINE ALIGN mode lamps on the IMU CONTROL panel shall light in the sequence stated above). The ZERO ENCODER condition lamp shall remain lighted for

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approximately 20 seconds after the system enters the final FINE ALIGN mode of the sequence indicated above.

43. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

44. Enter (and verify) + 00000 into the G and N DSKY. Press ENTER pushbutton.

45. Repeat step 44 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding to step 46.

46. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

47. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

48. Enter (and verify) VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

49. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° + 1.0000° into the G and N AGC DSKY. Press ENTER pushbutton.

50. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

51. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

52. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

53. Monitor Pitch error (θ) on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

54. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

55. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

56. Observe the PAVM and adjust MG CDU thumbwheel until PAVM indicates approximately + 1.5 volts. Insure that increasing angle on CDU results in positive voltage indication.

57. Measure the Yaw body offset error phase angle on PAVM. Record indication (and sign).

58. Observe the PAVM and obtain best possible in-phase null using MG CDU thumbwheel.

59. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

60. Set FUNCTION switch on the PAVM to TOTAL. Measure and

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record the PAVM indication.

61. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain -10 mv on 30 mv scale using MG CDU. Note the time interval for the error signal to drift from null to + 15 mv.

> NOTE: Read and understand steps 62 through 73 before proceeding. These steps must be accomplished as quickly as possible without interruption.

62. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

63. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

64. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

65. Enter + 50000 into the G and N AGC DSKY. DO NOT press ENTER pushbutton.

66. Observe the PAVM and obtain -20 mv signal on 30 mv scale using MG CDU. When the PAVM passes through -15 mv, start timing the interval obtained in step 61.

67. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Set DVM FUNCTION switch to AC. Press ENTER pushbutton on G and N AGC DSKY.

68. Using dc probes monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low).

69. At the end of the time interval started in step 66, record the DVM indication on the data sheet.

70. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

71. Set DVM to OFF.

72. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

73. Monitor Yaw body offset error ψ_{NB} at 45A7J1, pins 35 (high) and 36 (low) with ac probes on PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

74. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

75. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

76. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

77. Repeat step 76 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

78. Enter (and verify) VERB 42 into the G

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and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

79. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

80. Enter (and verify) VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

81. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° + 1.0000° into the G and N AGC DSKY. Press ENTER pushbutton.

82. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

83. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

84. Enter (and verify) VERB 43 into G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

85. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

86. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

87. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

88. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

89. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. SCS LOADS NORMAL shall light.

90. Monitor Yaw body error ψ_{SC} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

91. Observe the PAVM and obtain best possible null using OG CDU thumbwheel.

92. Observe the PAVM and adjust the MG CDU thumbwheel until PAVM indicates approximately + 1.25 volts. Insure that increasing angle on CDU results in positive voltage indication.

93. Measure the Yaw body error phase angle on PAVM. Record indication and sign.

94. Observe the PAVM and obtain best possible in-phase null using MG CDU thumbwheel.

95. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

96. Set FUNCTION switch on PAVM to TOTAL. Measure and record the PAVM indication.

97. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain -10 mv on 30 mv scale using MG CDU. Note the time interval for the error signal to

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drift from null to + 25 mv.

NOTE: Read and understand steps 98 through 109 before proceeding. These steps must be accomplished as quickly as possible without interruption.

98. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

99. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

100. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

101. Enter + 50000 into G and N AGC DSKY. DO NOT press ENTER pushbutton

102. Observe the PAVM and obtain -30 mv signal on 30 mv scale using MG CDU. When the PAVM passes through -25 mv, start timing the time interval obtained in step 97.

103. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC. Press ENTER pushbutton on G and N AGC DSKY.

104. Using dc probes monitor Yaw body error ψ_{SC} on PSA Adapter Tray 9, pins 34 (high) and 38 (low).

105. At the end of the time interval started in step 104, record the DVM indication on the data sheet.

106. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

107. Set DVM to OFF.

108. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

109. Monitor Yaw body error ψ_{SC} at 45A7J1, pins 7 (high) and 8 (low) with ac probes on PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

110. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

111. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

112. Depending upon the test site location, enter (and verify) the appropriate angle into the G and N AGC DSKY. (See chart below). Press ENTER pushbutton.

SITE LOCATION	Angle
ACSP	+ 07540
NAA	+ 06643
AMR	+ 0----
MIT	+ 07487
MSC	+ 0620

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113. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 60 seconds before proceeding.

114. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

115. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

116. Repeat step 115 twice.

CAUTION: During the following step, exercise adequate care to prevent damaging strain to connecting cables.

117. Observe the IG CDU indicator and carefully tilt the G and N Mounting Fixture until the IG CDU indicator reads 000.00°. Insure that at least 90 seconds has elapsed since performing step 116 before proceeding.

118. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

119. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

120. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

121. Repeat step 120 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

122. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

123. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry.

124. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS ENTRY pushbutton shall light.

125. Using ac probes monitor Roll body offset error ϕ_{NB} on PSA Adapter Tray 9, pins 35 (high) and 38 (low).

126. After at least 90 seconds has elapsed since performing step 123, enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

127. Observe the OG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

128. Enter + 00000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

129. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

130. Enter (and verify) + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

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131. Enter (and verify) +00000 into the G and N AGC DSKY. Press ENTER pushbutton.

132. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton. The ENTRY Mode lamp on the IMU CONTROL panel shall be the only mode lamp that lights.

133. Using OG CDU thumbwheel, adjust OG CDU until a null is obtained on the .01 volt scale of PAVM. Record OG CDU indication on calculation sheet.

134. Release thumbwheel of OG CDU and record OG CDU indication on calculation sheet.

135. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton.

136. Algebraically subtract indication of step 134 from indication of step 133 and enter (and verify) the result into the G and N AGC DSKY as ±XXX.XX degrees. Press ENTER pushbutton.

137. Enter (and verify) +00000 into G and N AGC DSKY twice. Press ENTER pushbutton after each entry.

NOTE: PAVM indication will oscillate. Determine peak to peak excursion and choose midpoint of excursion when making measurements in steps 138 and 144.

138. Observe PAVM indication on .1 volt scale. If indication remains on scale, record value and sign of midpoint of excursions on calculation sheet. If INDICATION DOES NOT remain fully on scale, repeat steps 136 through 138 adjusting the DSKY ENTRY of step 136 slightly until indication does stay on scale, and then record midpoint.

NOTE: Changing DSKY entry by ±000.01 will change reading by 0.048 volts.

139. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 235 to measure OGA 16X error at 56P9 pins 27 (high) and 26 (low) on the PAVM. Record midpoint of excursion on calculation sheet. (The PAVM voltage scale setting may be changed if necessary.) Return CROSSBAR CONTROL to 199.

140. Algebraically add +00031 to indication in row 1 of AGC DSKY.

141. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton. Enter result of addition in step 140 into G and N AGC DSKY as ±XXXXX. Press ENTER pushbutton.

142. Enter +00000 into G and N AGC DSKY twice, pressing the ENTER pushbutton after each entry. Wait 20 seconds before proceeding.

143. Record the indication and sign on 3 volt scale of PAVM on calculation sheet.

144. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 235 and record PAVM indication and sign on calculation sheet. Return CROSSBAR CONTROL to 199.

145. Monitor Roll body offset error ϕ_{NB} at 45A7J1, pins 27 (high) and 28 (low) using ac probes on the PSA Adapter. Record PAVM indication on calculation sheet and verify that indication is positive.

146. Monitor Roll body offset error ϕ_{NB} on PSA Adapter Tray 9, pins 35 (high) and 38 (low) using ac probes. Verify that PAVM indication is positive.

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147. Measure Roll body offset error phase angle on PAVM. Record indication and sign.

148. Use the OUTER GIMBAL CDU thumbwheel to obtain a fine null on the 0.003 scale of PAVM. Drift may be observed on PAVM. Obtain best possible null and then hold thumbwheel in subsequent steps 149 and 150.

149. Set FUNCTION switch on PAVM to 90°. Measure and record the PAVM indication (and sign).

150. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication. Release the thumbwheel.

151. Algebraically subtract indication recorded in step 138 from that recorded in step 143 on calculation sheet. Record result on data sheet.

152. Algebraically subtract indication recorded in step 139 from that recorded in step 144 on calculation sheet. Record result on data sheet.

153. Enter VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

154. Enter address 00007_8 into G and N AGC DSKY. AGC display shall indicate contents of mode register 3 in row 1 as 50140.

155. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

156. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

157. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

158. Enter (and verify) -03250 into the G and N AGC DSKY. Press ENTER pushbutton.

159. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 60 seconds.

160. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

161. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

162. Repeat step 161 twice.

CAUTION: During the following step, exercise adequate care to prevent damaging strain to connecting cables.

163. Observe the IG CDU indicator and carefully tilt the G and N Mounting Fixture until the IG CDU indicator reads 000.00°.

164. After at least 90 seconds has elapsed since performing step 162 enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

165. Observe the OG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

166. Observe the IG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

167. Observe the MG CDU indication as

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±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

168. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

169. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

170. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

171. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

172. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

173. Monitor Roll body error ϕ_{SC} on PSA Adapter Tray 9, pins 35 (high) and 38 (low) with ac probes.

174. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS NORMAL pushbutton shall light.

175. Observe the PAVM and adjust OG CDU thumbwheel until PAVM indicates approximately + 1.25 volts. Insure that increasing angle on CDU results in positive voltage indication.

176. Measure the Roll body error phase angle on PAVM and let PAVM degrees dial remain at this indication. Record indication (and sign).

177. Observe the PAVM and obtain best possible in-phase null using OG CDU thumbwheel.

178. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

179. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication.

NOTE: Perform steps 180 thru 188 as quickly as possible.

180. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain best possible null on 10 mv scale using OG CDU.

181. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC.

182. Using dc probes monitor Roll body error ϕ_{SC} on PSA Adapter Tray 9, pins 35 (high) and 38 (low).

183. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

184. Enter + 50000 into the G and N AGC DSKY. Press ENTER pushbutton.

185. Enter + 00000 into the G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

186. Record the DVM indication

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on the data sheet.

187. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR. Set DVM to OFF.

188. Set controls on PAVM as follows:
    FUNCTION to 0°
    DEGREES to 0°

189. Monitor Roll body error ϕ_{SC} at 45A7J1, pins 14 (high) and 15 (low) using ac probes on PSA Adapter. Verify that PAVM indication is positive and record value on calculation sheet.

190. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

191. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

192. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

193. Repeat step 192 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

194. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

195. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

196. Enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

197. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

198. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

199. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

200. Enter (and verify) VERB 43 into G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

201. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS ENTRY pushbutton shall light.

202. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

203. Observe the PAVM and obtain best possible null on 30 mv scale using MG CDU thumbwheel.

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204. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

205. Observe the PAVM and adjust the IG CDU thumbwheel until PAVM indicates approximately + 1.5 volts. Insure that increasing angle on CDU results in positive voltage indication.

206. Measure the Pitch error phase angle on the PAVM and let PAVM degrees dial remain at this indication. Record indication (and sign).

207. Observe the PAVM and obtain best possible in-phase null using IG CDU thumbwheel.

208. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

209. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication.

NOTE: Perform steps 210 thru 220 as quickly as possible.

210. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain best possible null on 10 mv scale using IG CDU.

211. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC.

212. Using dc probes monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low).

213. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

214. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

215. Enter + 50000 into the G and N AGC DSKY. Press ENTER pushbutton.

216. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

217. Record the DVM indication on the data sheet.

218. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR. Set DVM to OFF.

219. Set controls on PAVM as follows:
    FUNCTION to 0°
    DEGREES to 0°

220. Monitor Pitch error θ at 45A7J1, pins 20 (high) and 21 (low) with ac probes on the PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

221. Enter (and verify) VERB 41, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

222. Enter + 09000 into G and N AGC DSKY. Press ENTER pushbutton.

223. Enter + 00000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry. Wait at least 60 seconds before proceeding.

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224. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton.

225. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) using ac probes.

226. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

227. Enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton, The VERB-NOUN display shall flash and indicate 21-67.

228. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

229. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

230. Enter + 50000 into G and N AGC DSKY. Press ENTER pushbutton.

231. Verify that the PAVM indication is positive (approximately + 1.5 volts).

232. Enter (and verify) VERB 41. NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

233. Enter + 00000 into G and N AGC DSKY three times pressing ENTER pushbutton after each entry. Wait at least 60 seconds before proceeding.

234. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

235. Enter + 00000 into G and N AGC DSKY three times pressing the ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding. Repeat steps 196 thru 199.

236. Enter (and verify) VERB 44 (ATTITUDE CONTROL mode) into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-23.

237. Enter +00500 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The ATT CONT lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

238. Record INNER IMU CDU DIFFERENCE meter indication.

239. Record MIDDLE IMU CDU DIFFERENCE meter indication.

240. Record OUTER IMU CDU DIFFERENCE meter indication.

241. Enter (and verify) VERB 11, NOUN 01 into the G and N AGC DSKY. Press ENTER pushbutton.

242. Enter 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate contents of mode register 3 in row 1 as 50060.

243. Enter VERB 42, NOUN 67 into G and N AGC DSKY. Press ENTER pushbutton.

244. Enter VERB 33 in G and N AGC DSKY. Press ENTER pushbutton. Wait at least 90 seconds.

245. Enter (and verify) VERB 41, NOUN 20

DATE __________

into G and N AGC DSKY. Press ENTER pushbutton. The G and N AGC DSKY shall flash and indicate 21-22.

246. Enter (and verify) VERB 33 into G and N AGC DSKY. Press ENTER pushbutton.

247. Enter (and verify) VERB 33 into G and N AGC DSKY. Press ENTER pushbutton. The COARS ALIGN mode lamp on the IMU CONTROL panel is the only mode lamp that is lighted.

248. Pressing of any of the mode pushbuttons on the IMU CONTROL panel shall not cause any of the mode lamps to light or go out.

249. Tilt the G and N Mounting Fixture to the 32.5 ± 0.5 degree position.

250. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 73}}{\text{Magnitude of step 69}}$$

Record on data sheet.

251. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 109}}{\text{Magnitude of step 105}}$$

Record on data sheet.

252. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 145}}{\text{Magnitude of step 143}}$$

Record on data sheet.

253. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 189}}{\text{Magnitude of step 186}}$$

Record on data sheet.

254. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 220}}{\text{Magnitude of step 217}}$$

Record on data sheet.

255. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 105}}{\text{Magnitude of step 69}}$$

Record on data sheet.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 6

JDC
NO. 10084
REV. A
INITIAL TDRR 21539

JOB AGC MODE CONTROL TEST

ASSEMBLY UNDER TEST
TITLE ________
SER. NO. ________ DWG ________ REV. ____

TEST HISTORY
DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ________ SER. NO. ________ ________ CAL DATE
NAME ________ SER. NO. ________ ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
9	OUTER GIMBAL CDU	deg	-0.006				+0.006		
9	MIDDLE GIMBAL CDU	deg	-0.006				+0.006		
9	INNER GIMBAL CDU	deg	-0.006				+0.006		
16	IG time	sec	0				5.0		
20	MG time	sec	0				5.0		
25	OG time	sec	0				5.0		
28	IG IMU CDU DIFF	deg	-1.0				+1.0		
28	MG IMU CDU DIFF	deg	-1.0				+1.0		
28	OG IMU CDU DIFF	deg	-1.0				+1.0		
29a	IG CDU 1X error	mv rms	0				150		
29b	MG CDU 1X error	mv rms	0				150		
29c	OG CDU 1X error	mv rms	0				150		
29d	IGA 1X-sine	volts rms	20.25				24.75		
29e	IGA 1X cosine	volts rms	11.7				14.3		

* TO BE USED AS REQUIRED OR DESIRED

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 6

JDC
NO. 10084
REV. A

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
29f	MGA 1X sine	volts rms	20.25				24.75		
29g	MGA 1X cosine	volts rms	11.7				14.3		
29h	OGA 1X sine	volts rms	20.25				24.75		
29i	OGA 1X cosine	volts rms	11.7				14.3		
30a	MGA 1X sine	deg	+1.0				+11.0		
30b	MGA 1X sine	deg	+1.0				+11.0		
30c	OGA 1X sine	deg	+1.0				+11.0		
30d	IGA 1X cosine	deg	+1.0				+11.0		
30e	MGA 1X cosine	deg	+1.0				+11.0		
30f	OGA 1X cosine	deg	+1.0				+11.0		
36a	IG CDU 16X error **	mv rms	-24.0				+24.0		
36b	MG CDU 16X error **	mv rms	-24.0				+24.0		
36c	OG CDU 16X error **	mv rms	-24.0				+24.0		
57	Yaw error ψ_{NB} Phase Shift	deg	-5.5				+5.5		
59	Yaw error ψ_{NB} Quad**	mv rms	-124				+124		
60	Yaw error ψ_{NB} Total**	mv rms	0				125		

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using the 'MULT BY' factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 6

JDC
NO. 10084
REV. A

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
69	Yaw body offset error ψ_{NB} (S/C)	volts rms	1.42				1.58		
93	Yaw error ψ_{SC} Phase Angle	deg	-5.5				+5.5		
95	Yaw error ψ_{SC} Quad.**	mv rms	-124				+124		
96	Yaw error ψ_{SC} Total**	mv rms	0				125		
105	Yaw body error ψ_{SC} (S/C)	volts rms	1.19				1.33		
147	Roll error ϕ_{NB} Phase Shift	deg	-5.5				+5.5		
149	Roll error ϕ_{NB} Quad.**	mv rms	-124				+124		
150	Roll error ϕ_{NB} Total**	mv rms	0				125		
151	Roll body offset error ϕ_{NB}(S/C)**	volts rms	+1.35				+1.65		
152	OGA 16X error	volts	-2.05				-2.51		
176	Roll error ϕ_{SC} Phase angle	deg	-5.5				+5.5		
178	Roll error ϕ_{SC} Quad.**	mv rms	-124				+124		
179	Roll error ϕ_{SC} Total**	mv rms	0				125		
186	Roll body error ϕ_{SC} (S/C)	volts	1.19				1.33		
206	Pitch error θ Phase Angle	deg	-8.9				+2.3		

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using the 'MULT BY' factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 6

JDC
NO. 10084
REV. A

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
208	Pitch error θ Quad.**	mv rms	-124				+124		
209	Pitch error θ Total**	mv rms	0				125		
217	Pitch body & off-set Error θ (S/C)	volts rms	1.42				1.58		
238	IG IMU CDU DIFF	deg	-4.0				-5.0		
239	MG IMU CDU DIFF	deg	-4.0				-5.0		
240	OG IMU CDU DIFF	deg	-4.0				-5.0		
250	Yaw body offset Error ratio		0.9				1.1		
251	Yaw body Error ratio		0.9				1.1		
252	Roll body offset Error ratio		0.9				1.1		
253	Roll body error ratio		0.9				1.1		
254	Pitch error ratio		0.9				1.1		
255	Yaw body to yaw offset error ratio		0.797				0.881		
	G&N AGC DSKY displays			DSKY displays were in accordance with those specified throughout the JDC.					
	G&N lamp displays			Lamp displays were in accordance with those specified throughout the JDC.					

* TO BE USED AS REQUIRED OR DESIRED
**Correct this measurement using the 'MULT BY' factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 6

JDC
NO. 10084
REV. A

JOB AGC MODE CONTROL TEST

CALCULATION				
JDC ITEM NUMBER	PARAMETER	SIGN	VALUE	UNITS
73	Yaw body offset error ψ_{NB} (5°) (PSA)	+		volts rms
109	Yaw body error ψ_{SC} (5°) (PSA)	+		volts rms
133	OG CDU			degrees
134	OG CDU			degrees
138				volts rms
139				volts rms
143				volts rms
144				volts rms
145	Roll body offset error ϕ_{NB} (5°) (PSA)	+		volts rms
151	(Step 143 above) - (sign and magnitude of step 138 above)			volts rms
152	(Step 144 above) - (Sign and magnitude of step 139 above)			volts rms
189	Roll body error ϕ_{SC} (5°) (PSA)	+		volts rms
220	Pitch error θ (5°) (PSA)	+		volts rms
250	(Step 73 above) ÷ (Step 69)	+		
251	(Step 109 above) ÷ (Step 105)	+		
252	(Step 145 above) ÷ (Step 143)	+		

REMARKS:

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 6

JDC
NO. 10084
REV. A

JOB AGC MODE CONTROL TEST

CALCULATION				
JDC ITEM NUMBER	PARAMETER	SIGN	VALUE	UNITS
253	(Step 189 above) ÷ (Step 186)	+		
254	(Step 220 above) ÷ (Step 217)	+		
255	(Step 105) ÷ (Step 69)	+		

JDC 10084 REV. B PAGE 1 OF 17
JOB AGC MODE CONTROL TEST
INITIAL TDRR 21539 D.S. PGS 6
SUBSYSTEM G AND N SYSTEM
ASSY.

DESCRIPTION The G and N System is sequenced through its operating modes using the computer to initialize each mode. Visual displays of the modes are verified on IMU CONTROL panel and AGC display of mode register 3 as well as spacecraft, PSA front panel and telemetry interface.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-21-65	22662	12, 16	-	WK	ACM
B	11-3-65	23738	All	All	WK	ACM

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.3.1, 3-3.4.3.3, 3-3.8 2.1, 3-3.11.1.6 through 3-3.11.1.10, 3-3.11.2.62, 3-3.11.3.66, 3-3.11.2.67, 3-3.11.2.121 and 3-3.11.3.43 through 3-3.11.51, 3-3.11.2.82 through 3-3.11.2.84, 3-3.11.2.87 through 3-3.11.2.91, and 3-3.11.3.68 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. Those signals listed on the Data Sheet which are starred (**) must be corrected by the multiplication factor found on the signal identification drawings 1902141-003 or 1902141-004 to obtain the true value.

1. Tilt G and N Mounting Fixture 32.5 ± 0.5 degrees.

2. Insure that TRANSFER switch on IMU CONTROL panel is set to COMPUTER.

3. Insure that TRACKER POWER switch on G and N indicator control panel is set to OFF and optics mode selector is set to MANUAL.

4. Set following switches on PRIMARY SIGNAL SELECTOR panel:

COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton - "D" PULSE lighted

5. Set switches and controls on COUNTER as follows:

SAMPLE TIME (N_1) to 002048

VERIFICATION WITH SIDL REQUIRED BEFORE USE

CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to RATIO OR PERIOD
INPUT SELECTOR to C SENSE
SENSE SELECTOR to FWD
ATTN D to 10AC
SLOPE to +
TRIGGER VOLTAGE as required

NOTE: Read and understand steps 6 through 10 before proceeding. Perform steps 7 through 10 within 40 seconds after initiating step 6.

6. Enter (and verify) VERB 40, NOUN 20 (ZERO ENC mode) into G and N AGC DSKY. Press ENTER pushbutton. (The ZERO ENC, FINE ALIGN, ATT CONT and FINE ALIGN mode lamps on IMU CONTROL panel shall light in sequence stated above.) The ZERO ENCODER condition lamp shall remain lighted for approximately 20 seconds after the system enters the final FINE ALIGN mode of the sequence indicated above.

7. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

8. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate the contents of mode register 3 in row 1 as 50051.

9. The OUTER GIMBAL, MIDDLE GIMBAL and INNER GIMBAL CDU's shall indicate 0.000 (±0.006°). Record.

10. Enter (and verify) VERB 15, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display shall indicate the contents of X, Y and Z CDU counters in rows 1, 2 and 3 as all zeros prior to entering the first FINE ALIGN mode of the sequence stated in step 6.

NOTE: If rows 1, 2 and 3 do not each indicate 00000, repeat steps 6 and 10 once after the ZERO ENCODER light goes out. If they again do not indicate 00000, the system has failed the test.

11. Enter (and verify) VERB 41, NOUN 20 into G & N AGC DSKY. Press ENTER pushbutton; the VERB-NOUN display shall flash and indicate 21-22.

12. Enter +00000 into G and N AGC DSKY three times pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing after pressing ENTER pushbutton the third time and the COARS ALIGN lamp on the IMU CONTROL panel shall light and the FINE ALIGN lamp shall go out.

13. Monitor IG + Δθ pulses at 45A5J1, pins 23 (high) and 1 (low) using pulse probes on PSA Adapter.

14. Enter (and verify) VERB 25, NOUN 22 into the G and N AGC DSKY. Press ENTER

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pushbutton. VERB-NOUN display shall flash and indicate 21-22.

15. Enter +06000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

16. Enter +06000 into G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record second printout of the DIGITAL RECORDER.

NOTE: The GIMBAL LOCK lamps on the Condition Annunciator and MONITOR panel may light. Disregard these lamp indications unless specifically indicated to do otherwise.

17. Monitor MG -Δθ pulses at 45A5J1 pins 32 (high) and 1 (low) using pulse probes on PSA Adapter.

18. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

19. Enter +00000 into G and N AGC DSKY twice pressing the ENTER pushbutton after each entry.

20. Enter +00000 into the G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record the second printout of the DIGITAL RECORDER.

21. Monitor OG + Δθ pulses at 45A5J1, pins 25 (high) and 1 (low) using pulse probes on PSA Adapter.

22. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

23. Enter +06000 into G and N AGC DSKY. Press ENTER pushbutton.

24. Enter +06000 into G and N AGC DSKY. Press the ENTER pushbutton.

25. Enter +06000 into the G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record the second printout of the DIGITAL RECORDER.

26. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

27. Enter address 00007_8 into G& N AGC DSKY. Press ENTER pushbutton. AGC DSKY shall indicate the contents of mode register 3 in row 1 as 50042.

28. Record the IMU-CDU DIFFERENCE meter indications.

29. Measure in phase voltage of the following signals on the PAVM using CROSSBAR CONTROL setting indicated for each signal (CROSSBAR CONTROL is located on PRIMARY SIGNAL SELECTOR):

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IG CDU 1X error	232	56P9 pins 59 (high) and 41 (low)
b. MG CDU 1X error	231	56P9 pins 60 (high) and 43 (low)
c. OG CDU 1X error	230	56P9 pins 77 (high) and 61 (low)
d. IGA 1X sine	144	56P9 pins 1 (S2) and 23 (S4)
e. IGA 1X cosine	243	56P9 pins 2(S1) and 3 (S3)
f. MGA 1X sine	143	56P9 pins 24 (S2) and 42 (S4)
g. MGA 1X cosine	242	56P9 pins 25 (S1) and 44 (S3)
h. OGA 1X sine	142	56P9 pins 4 (S2) and 26 (S4)
i. OGA 1X cosine	241	56P9 pins 45 (S1) and 27 (S3)

30. Measure the phase angle of the following signals with respect to 800~ demod. reference on the PAVM by using the CROSSBAR CONTROL setting indicated for each signal:

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IGA 1X sine	144	56P9 pins 1 (S2) and 23 (S4)
b. MGA 1X sine	143	56P9 pins 24 (S2) and 42 (S4)
c. OGA 1X sine	142	56P9 pins 4 (S2) and 26 (S4)
d. IGA 1X cosine	243	56P9 pins 2 (S1) and 3 (S3)
e. MGA 1X cosine	242	56P9 pins 25 (S1) and 44 (S3)
f. OGA 1X cosine	241	56P9 pins 45 (S1) and 27 (S3)

Record indications.

31. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY.

32. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

33. Enter + 00000 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing.

34. Enter (and verify) VERB 42 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

35. Enter (and verify) VERB 33. Press ENTER pushbutton. The VERB-NOUN display shall stop flashing and indicate 42-67. The FINE ALIGN mode lamp on the IMU CONTROL panel shall be the only lamp that lights.

36. Monitor in-phase voltage of the following signals on the PAVM using CROSSBAR CONTROL setting indicated for each signal:

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IG CDU 16X error	229	45A6J1 pins 20 (high) and 21 (low)
b. MG CDU 16X error	228	45A6J1 pins 27 (high) and 28 (low)
c. OG CDU 16X error	227	45A6J1 pins 35 (high) and 36 (low)

Record indications.

37. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

38. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate the contents of mode register 3 in row 1 as 50050.

39. Insure that the SCS LOADS ENTRY pushbutton on the TEST CONTROL panel is lighted.

40. Set CROSSBAR CONTROL to 99 and VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

41. Calibrate the PAVM with FREQUENCY control set to 800 ~ #2. Set controls as follows:

FUNCTION to 0°
DEGREES to 0°

42. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton (the ZERO ENC, FINE ALIGN, ATT CONT and FINE ALIGN mode lamps on the IMU CONTROL panel shall light in the sequence stated above). The ZERO ENCODER condition lamp shall remain lighted for

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approximately 20 seconds after the system enters the final FINE ALIGN mode of the sequence indicated above.

43. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

44. Enter (and verify) + 00000 into the G and N DSKY. Press ENTER pushbutton.

45. Repeat step 44 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding to step 46.

46. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

47. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

48. Enter (and verify) VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

49. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° + 1.0000° into the G and N AGC DSKY. Press ENTER pushbutton.

50. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

51. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

52. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

53. Monitor Pitch error (θ) on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

54. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

55. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

56. Observe the PAVM and adjust MG CDU thumbwheel until PAVM indicates approximately + 1.5 volts. Insure that increasing angle on CDU results in positive voltage indication.

57. Measure the Yaw body offset error phase angle on PAVM. Record indication (and sign).

58. Observe the PAVM and obtain best possible in-phase null using MG CDU thumbwheel.

59. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

60. Set FUNCTION switch on the PAVM to TOTAL. Measure and

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record the PAVM indication.

61. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain -10 mv on 30 mv scale using MG CDU. Note the time interval for the error signal to drift from null to + 15 mv.

> NOTE: Read and understand steps 62 through 73 before proceeding. These steps must be accomplished as quickly as possible without interruption.

62. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

63. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

64. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

65. Enter + 50000 into the G and N AGC DSKY. DO NOT press ENTER pushbutton.

66. Observe the PAVM and obtain -20 mv signal on 30 mv scale using MG CDU. When the PAVM passes through -15 mv, start timing the interval obtained in step 61.

67. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Set DVM FUNCTION switch to AC. Press ENTER pushbutton on G and N AGC DSKY.

68. Using dc probes monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low).

69. At the end of the time interval started in step 66, record the DVM indication on the data sheet.

70. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

71. Set DVM to OFF.

72. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

73. Monitor Yaw body offset error ψ_{NB} at 45A7J1, pins 35 (high) and 36 (low) with ac probes on PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

74. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

75. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

76. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

77. Repeat step 76 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

78. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

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79. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

80. Enter (and verify) VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

81. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° + 1.0000° into the G and N AGC DSKY. Press ENTER pushbutton.

82. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

83. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

84. Enter (and verify) VERB 43 into G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

85. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

86. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

87. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

88. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

89. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. SCS LOADS NORMAL shall light.

90. Monitor Yaw body error ψ_{SC} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

91. Observe the PAVM and obtain best possible null using OG CDU thumbwheel.

92. Observe the PAVM and adjust the MG CDU thumbwheel until PAVM indicates approximately + 1.25 volts. Insure that increasing angle on CDU results in positive voltage indication.

93. Measure the Yaw body error phase angle on PAVM. Record indication and sign.

94. Observe the PAVM and obtain best possible in-phase null using MG CDU thumbwheel.

95. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

96. Set FUNCTION switch on PAVM to TOTAL. Measure and record the PAVM indication.

97. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain -10 mv on 30 mv scale using MG CDU. Note the time interval for the error signal to

drift from null to + 25 mv.

NOTE: Read and understand steps 98 through 109 before proceeding. These steps must be accomplished as quickly as possible without interruption.

98. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

99. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

100. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

101. Enter + 50000 into G and N AGC DSKY. DO NOT press ENTER pushbutton

102. Observe the PAVM and obtain -30 mv signal on 30 mv scale using MG CDU. When the PAVM passes through -25 mv, start timing the time interval obtained in step 97.

103. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC. Press ENTER pushbutton on G and N AGC DSKY.

104. Using dc probes monitor Yaw body error ψ_{SC} on PSA Adapter Tray 9, pins 34 (high) and 38 (low).

105. At the end of the time interval started in step 104, record the DVM indication on the data sheet.

106. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

107. Set DVM to OFF.

108. Set controls on PAVM as follows:

FUNCTION to 0°

DEGREES to 0°

109. Monitor Yaw body error ψ_{SC} at 45A7J1, pins 7 (high) and 8 (low) with ac probes on PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

110. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

111. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

112. Depending upon the test site location, enter (and verify) the appropriate angle into the G and N AGC DSKY. (See chart below). Press ENTER pushbutton.

SITE LOCATION	Angle
ACSP	+ 07540
NAA	+ 06643
AMR	+ 0----
MIT	+ 07487
MSC	+ 06206

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113. Enter (and verify) +00000 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 60 seconds before proceeding.

114. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

115. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

116. Repeat step 115 twice.

CAUTION: During the following step, exercise adequate care to prevent damaging strain to connecting cables.

117. Observe the IG CDU indicator and carefully tilt the G and N Mounting Fixture until the IG CDU indicator reads 000.00°. Insure that at least 90 seconds have elapsed since performing step 116 before proceeding.

118. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

119. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

120. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

121. Repeat step 120 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

122. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

123. Enter +00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry.

124. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS ENTRY pushbutton shall light.

125. Using ac probes monitor Roll body offset error ϕ_{NB} on PSA Adapter Tray 9, pins 35 (high) and 38 (low).

126. After at least 90 seconds have elapsed since performing step 123, enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

127. Observe the OG CDU indications as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

128. Enter +00000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry. Enter (and verify) VERB 21, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton. Enter (and verify) 00713 and press ENTER pushbutton. Enter (and verify) 37777 and press ENTER pushbutton.

129. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

130. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

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131. Enter (and verify) +00000 into the G and N AGC DSKY. Press ENTER pushbutton.

132. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton. The ENTRY Mode lamp on the IMU CONTROL panel shall be the only mode lamp that lights.

133. Using OG CDU thumbwheel, adjust OG CDU until a null is obtained on the .01 volt scale of PAVM. Record OG CDU indication on calculation sheet.

134. Release thumbwheel of OG CDU and record OG CDU indication on calculation sheet.

135. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton.

136. Algebraically subtract indication of step 134 from indication of step 133 and enter (and verify) the result into the G and N AGC DSKY as ±XXX.XX degrees. Press ENTER pushbutton.

137. Enter (and verify) +00000 into G and N AGC DSKY twice. Press ENTER pushbutton after each entry.

NOTE: PAVM indication will oscillate. Determine peak to peak excursion and choose midpoint of excursion when making measurements in steps 138 and 144.

138. Observe PAVM indication on .1 volt scale. If indication remains on scale, record value and sign of midpoint of excursions on calculation sheet. If INDICATION DOES NOT remain fully on scale, repeat steps 136 through 138 adjusting the DSKY ENTRY of step 136 slightly until indication does stay on scale, and then record midpoint.

NOTE: Changing DSKY entry by ±000.01 will change reading by 0.048 volts.

139. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 235 to measure OGA 16X error at 56P9 pins 27 (high) and 26 (low) on the PAVM. Record midpoint of excursion on calculation sheet. (The PAVM voltage scale setting may be changed if necessary.) Return CROSSBAR CONTROL to 199.

140. Algebraically add +00031 to indication in row 1 of AGC DSKY.

141. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton. Enter result of addition in step 140 into G and N AGC DSKY as ±XXXXX. Press ENTER pushbutton.

142. Enter +00000 into G and N AGC DSKY twice, pressing the ENTER pushbutton after each entry. Wait 20 seconds before proceeding.

143. Record the indication and sign on 3 volt scale of PAVM on calculation sheet.

144. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 235 and record PAVM indication and sign on calculation sheet. Return CROSSBAR CONTROL to 199.

145. Monitor Roll body offset error ϕ_{NB} at 45A7J1, pins 27 (high) and 28 (low) using ac probes on the PSA Adapter. Record PAVM indication on calculation sheet and verify that indication is positive.

146. Monitor Roll body offset error ϕ_{NB} on PSA Adapter Tray 9, pins 35 (high) and 38 (low) using ac probes. Verify that PAVM indication is positive.

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147. Measure Roll body offset error phase angle on PAVM. Record indication and sign.

148. Use the OUTER GIMBAL CDU thumbwheel to obtain a fine null on the 0.003 scale of PAVM. Drift may be observed on PAVM. Obtain best possible null and then hold thumbwheel in subsequent steps 149 and 150.

149. Set FUNCTION switch on PAVM to 90°. Measure and record the PAVM indication (and sign).

150. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication. Release the thumbwheel.

151. Algebraically subtract indication recorded in step 138 from that recorded in step 143 on calculation sheet. Record result on data sheet.

152. Algebraically subtract indication recorded in step 139 from that recorded in step 144 on calculation sheet. Record result on data sheet.

153. Enter VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

154. Enter address 00007_8 into G and N AGC DSKY. AGC display shall indicate contents of mode register 3 in row 1 as 50140.

155. Set controls on PAVM as follows:

FUNCTION to 0°

DEGREES to 0°

156. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

157. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

158. Enter (and verify) -03250 into the G and N AGC DSKY. Press ENTER pushbutton.

159. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 60 seconds.

160. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

161. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

162. Repeat step 161 twice.

CAUTION: During the following step, exercise adequate care to prevent damaging strain to connecting cables.

163. Observe the IG CDU indicator and carefully tilt the G and N Mounting Fixture until the IG CDU indicator reads 000.00°.

164. After at least 90 seconds has elapsed since performing step 162 enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

165. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

166. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

167. Observe the MG CDU indication as

±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

168. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

169. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

170. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

171. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

172. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

173. Monitor Roll body error ϕ_{SC} on PSA Adapter Tray 9, pins 35 (high) and 38 (low) with ac probes.

174. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS NORMAL pushbutton shall light.

175. Observe the PAVM and adjust OG CDU thumbwheel until PAVM indicates approximately + 1.25 volts. Insure that increasing angle on CDU results in positive voltage indication.

176. Measure the Roll body error phase angle on PAVM and let PAVM degrees dial remain at this indication. Record indication (and sign).

177. Observe the PAVM and obtain best possible in-phase null using OG CDU thumbwheel.

178. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

179. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication.

NOTE: Perform steps 180 thru 188 as quickly as possible.

180. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain best possible null on 10 mv scale using OG CDU.

181. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC.

182. Using dc probes monitor Roll body error ϕ_{SC} on PSA Adapter Tray 9, pins 35 (high) and 38 (low).

183. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

184. Enter + 50000 into the G and N AGC DSKY. Press ENTER pushbutton.

185. Enter + 00000 into the G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

186. Record the DVM indication

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on the data sheet.

187. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR. Set DVM to OFF.

188. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

189. Monitor Roll body error ϕ_{SC} at 45A7J1, pins 14 (high) and 15 (low) using ac probes on PSA Adapter. Verify that PAVM indication is positive and record value on calculation sheet.

190. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

191. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

192. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

193. Repeat step 192 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

194. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

195. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

196. Enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

197. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

198. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

199. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

200. Enter (and verify) VERB 43 into G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

201. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS ENTRY pushbutton shall light.

202. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

203. Observe the PAVM and obtain best possible null on 30 mv scale using MG CDU thumbwheel.

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204. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

205. Observe the PAVM and adjust the IG CDU thumbwheel until PAVM indicates approximately + 1.5 volts. Insure that increasing angle on CDU results in positive voltage indication.

206. Measure the Pitch error phase angle on the PAVM and let PAVM degrees dial remain at this indication. Record indication (and sign).

207. Observe the PAVM and obtain best possible in-phase null using IG CDU thumbwheel.

208. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

209. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication.

NOTE: Perform steps 210 thru 220 as quickly as possible.

210. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain best possible null on 10 mv scale using IG CDU.

211. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC.

212. Using dc probes monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low).

213. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

214. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

215. Enter + 50000 into the G and N AGC DSKY. Press ENTER pushbutton.

216. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

217. Record the DVM indication on the data sheet.

218. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR. Set DVM to OFF.

219. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

220. Monitor Pitch error θ at 45A7J1, pins 20 (high) and 21 (low) with ac probes on the PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

221. Enter (and verify) VERB 41, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

222. Enter + 09000 into G and N AGC DSKY. Press ENTER pushbutton.

223. Enter + 00000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry. Wait at least 60 seconds before proceeding.

Enter (and verify) VERB 43 into the G AGC DSKY. Press ENTER pushbutton.

225. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) using ac probes.

226. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

227. Enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

228. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

229. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

230. Enter + 50000 into G and N AGC DSKY. Press ENTER pushbutton.

231. Verify that the PAVM indication is positive (approximately + 1.5 volts).

232. Enter (and verify) VERB 41, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

233. Enter + 00000 into G and N AGC DSKY three times pressing ENTER pushbutton after each entry. Wait at least 60 seconds before proceeding.

234. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

235. Enter + 00000 into G and N AGC DSKY three times pressing the ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding. Repeat steps 196 thru 199.

236. Enter (and verify) VERB 44 (ATTITUDE CONTROL mode) into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-23.

237. Enter +00500 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The ATT CONT lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

238. Record INNER IMU CDU DIFFERENCE meter indication.

239. Record MIDDLE IMU CDU DIFFERENCE meter indication.

240. Record OUTER IMU CDU DIFFERENCE meter indication.

241. Enter (and verify) VERB 11, NOUN 01 into the G and N AGC DSKY. Press ENTER pushbutton.

242. Enter 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate contents of mode register 3 in row 1 as 50060.

243. Enter VERB 42, NOUN 67 into G and N AGC DSKY. Press ENTER pushbutton.

244. Enter VERB 33 in G and N AGC DSKY. Press ENTER pushbutton. Wait at least 90 seconds.

245. Enter (and verify) VERB 41, NOUN 20

into G and N AGC DSKY. Press ENTER pushbutton. The G and N AGC DSKY shall flash and indicate 21-22.

246. Enter (and verify) VERB 33 into G and N AGC DSKY. Press ENTER pushbutton.

247. Enter (and verify) VERB 33 into G and N AGC DSKY. Press ENTER pushbutton. The COARS ALIGN mode lamp on the IMU CONTROL panel is the only mode lamp that is lighted.

248. Pressing of any of the mode pushbuttons on the IMU CONTROL panel shall not cause any of the mode lamps to light or go out.

249. Tilt the G and N Mounting Fixture to the 32.5 ± 0.5 degree position.

250. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 73}}{\text{Magnitude of step 69}}$$

Record on data sheet.

251. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 109}}{\text{Magnitude of step 105}}$$

Record on data sheet.

252. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 145}}{\text{Magnitude of step 143}}$$

Record on data sheet.

253. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 189}}{\text{Magnitude of step 186}}$$

Record on data sheet.

254. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 220}}{\text{Magnitude of step 217}}$$

Record on data sheet.

255. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 105}}{\text{Magnitude of step 69}}$$

Record on data sheet.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 6

NO. 10084 JDC
REV. B
INITIAL TDRR 21539

JOB AGC MODE CONTROL TEST

ASSEMBLY UNDER TEST

TITLE ____________

SER. NO. ______ DWG ______ REV. ____

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________ SER. NO. ______ CAL DATE

NAME ____________ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
9	OUTER GIMBAL CDU	deg	-0.006				+0.006		
9	MIDDLE GIMBAL CDU	deg	-0.006				+0.006		
9	INNER GIMBAL CDU	deg	-0.006				+0.006		
16	IG time	sec	0				5.0		
20	MG time	sec	0				5.0		
25	OG time	sec	0				5.0		
28	IG IMU CDU DIFF	deg	-1.0				+1.0		
28	MG IMU CDU DIFF	deg	-1.0				+1.0		
28	OG IMU CDU DIFF	deg	-1.0				+1.0		
29a	IG CDU 1X error	mv rms	0				150		
29b	MG CDU 1X error	mv rms	0				150		
29c	OG CDU 1X error	mv rms	0				150		
29d	IGA 1X-sine	volts rms	20.25				24.75		
29e	IGA 1X cosine	volts rms	11.7				14.3		

* TO BE USED AS REQUIRED OR DESIRED

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 6

JDC
NO. 10084
REV. B

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
29f	MG.. 1X sine	volts rms	20.25				24.75		
29g	MGA 1X cosine	volts rms	11.7				14.3		
29h	OGA 1X sine	volts rms	20.25				24.75		
29i	OGA 1X cosine	volts rms	11.7				14.3		
30a	MGA 1X sine	deg	+1.0				+11.0		
30b	MGA 1X sine	deg	+1.0				+11.0		
30c	OGA 1X sine	deg	+1.0				+11.0		
30d	IGA 1X cosine	deg	+1.0				+11.0		
30e	MGA 1X cosine	deg	+1.0				+11.0		
30f	OGA 1X cosine	deg	+1.0				+11.0		
36a	IG CDU 16X error **	mv rms	-24.0				+24.0		
36b	MG CDU 16X error **	mv rms	-24.0				+24.0		
36c	OG CDU 16X error **	mv rms	-24.0				+24.0		
57	Yaw error ψ_{NB} Phase Shift	deg	-5.5				+5.5		
59	Yaw error ψ_{NB} Quad**	mv rms	-124				+124		
60	Yaw error ψ_{NB} Total**	mv rms	0				125		

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using the 'MULT BY' factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 **OF** 6

JDC
NO. 10084
REV. B

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
69	Yaw body offset error ψ_{NB} (S/C)	volts rms	1.42				1.58		
93	Yaw error ψ_{SC} Phase Angle	deg	-5.5				+5.5		
95	Yaw error ψ_{SC} Quad. **	mv rms	-124				+124		
96	Yaw error ψ_{SC} Total**	mv rms	0				125		
105	Yaw body error ψ_{SC} (S/C)	volts rms	1.19				1.33		
147	Roll error ϕ_{NB} Phase Shift	deg	-5.5				+5.5		
149	Roll error ϕ_{NB} Quad. **	mv rms	-124				+124		
150	Roll error ϕ_{NB} Total**	mv rms	0				125		
151	Roll body offset error ϕ_{NB}(S/C)**	volts rms	+1.35				+1.65		
152	OGA 16X error	volts	-2.05				-2.51		
176	Roll error ϕ_{SC} Phase angle	deg	-5.5				+5.5		
178	Roll error ϕ_{SC} Quad. **	mv rms	-124				+124		
179	Roll error ϕ_{SC} Total**	mv rms	0				125		
186	Roll body error ϕ_{SC} (S/C)	volts	1.19				1.33		
206	Pitch error θ Phase Angle	deg	-8.9				+2.3		

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using the 'MULT BY' factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 **OF** 6

JDC
NO. 10084
REV. B

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
208	Pitch error θ Quad.**	mv rms	-124				+124		
209	Pitch error θ Total**	mv rms	0				125		
217	Pitch body & offset Error θ (S/C)	volts rms	1.42				1.58		
238	IG IMU CDU DIFF	deg	-4.0				-5.0		
239	MG IMU CDU DIFF	deg	-4.0				-5.0		
240	OG IMU CDU DIFF	deg	-4.0				-5.0		
250	Yaw body offset Error ratio		0.9				1.1		
251	Yaw body Error ratio		0.9				1.1		
252	Roll body offset Error ratio		0.9				1.1		
253	Roll body error ratio		0.9				1.1		
254	Pitch error ratio		0.9				1.1		
255	Yaw bcdy to yaw offset error ratio		0.797				0.881		
	G&N AGC DSKY displays			DSKY displays were in accordance with those specified throughout the JDC.					
	G&N lamp displays			Lamp displays were in accordance with those specified throughout the JDC.					

*** TO BE USED AS REQUIRED OR DESIRED**
**Correct this measurement using the 'MULT BY' factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 6

JDC
NO. 10084
REV. B

JOB AGC MODE CONTROL TEST

CALCULATION				
JDC ITEM NUMBER	PARAMETER	SIGN	VALUE	UNITS
73	Yaw body offset error ψ_{NB} (5°) (PSA)	+		volts rms
109	Yaw body error ψ_{SC} (5°) (PSA)	+		volts rms
133	OG CDU			degrees
134	OG CDU			degrees
138				volts rms
139				volts rms
143				volts rms
144				volts rms
145	Roll body offset error ϕ_{NB} (5°) (PSA)	+		volts rms
151	(Step 143 above) - (sign and magnitude of step 138 above)			volts rms
152	(Step 144 above) - (Sign and magnitude of step 139 above)			volts rms
189	Roll body error ϕ_{SC} (5°) (PSA)	+		volts rms
220	Pitch error θ (5°) (PSA)	+		volts rms
250	(Step 73 above) ÷ (Step 69)	+		
251	(Step 109 above) ÷ (Step 105)	+		
252	(Step 145 above) ÷ (Step 143)	+		

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 6

JDC
NO. 10084
REV. B

JOB AGC MODE CONTROL TEST

CALCULATION				
JDC ITEM NUMBER	PARAMETER	SIGN	VALUE	UNITS
253	(Step 189 above) ÷ (Step 186)	+		
254	(Step 220 above) ÷ (Step 217)	+		
255	(Step 105) ÷ (Step 69)	+		

DATE 12 AUG 65

JOB AGC MODE CONTROL TEST

JDC 10084 **REV.** C **PAGE** 1 **OF** 17
INITIAL TDRR 21539 **D.S. PGS** 6

SUBSYSTEM G AND N SYSTEM
ASSY.

DESCRIPTION The G and N System is sequenced through its operating modes using the computer to initialize each mode. Visual displays of the modes are verified on IMU CONTROL panel and AGC display of mode register 3 as well as spacecraft, PSA front panel and telemetry interface.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-21-65	22662	12, 16	-	WK	ACM
B	11-3-65	23738	All	All	WK	ACM
C	11-23-65	24261	5	-	WK	-

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.3.1, 3-3.4.3.3, 3-3.8 2.1, 3-3.11.1.6 through 3-3.11.1.10, 3-3.11.2.62, 3-3.11.3.66, 3-3.11.2.67, 3-3.11.2.121 and 3-3.11.3.43 through 3-3.11.51, 3-3.11.2.82 through 3-3.11.2.84, 3-3.11.2.87 through 3-3.11.2.91, and 3-3.11.3.68 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. Those signals listed on the Data Sheet which are starred (**) must be corrected by the multiplication factor found on the signal identification drawings 1902141-003 or 1902141-004 to obtain the true value.

1. Tilt G and N Mounting Fixture 32.5 ± 0.5 degrees.

2. Insure that TRANSFER switch on IMU CONTROL panel is set to COMPUTER.

3. Insure that TRACKER POWER switch on G and N indicator control panel is set to OFF and optics mode selector is set to MANUAL.

4. Set following switches on PRIMARY SIGNAL SELECTOR panel:

COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton - "D" PULSE lighted

5. Set switches and controls on COUNTER as follows:

SAMPLE TIME (N_1) to 002048

VERIFICATION WITH SIDL REQUIRED BEFORE USE

CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to RATIO OR PERIOD
INPUT SELECTOR to C SENSE
SENSE SELECTOR to FWD
ATTN D to 10AC
SLOPE to +
TRIGGER VOLTAGE as required

NOTE: Read and understand steps 6 through 10 before proceeding. Perform steps 7 through 10 within 40 seconds after initiating step 6.

6. Enter (and verify) VERB 40, NOUN 20 (ZERO ENC mode) into G and N AGC DSKY. Press ENTER pushbutton. (The ZERO ENC, FINE ALIGN, ATT CONT and FINE ALIGN mode lamps on IMU CONTROL panel shall light in sequence stated above.) The ZERO ENCODER condition lamp shall remain lighted for approximately 20 seconds after the system enters the final FINE ALIGN mode of the sequence indicated above.

7. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

8. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate the contents of mode register 3 in row 1 as 50051.

9. The OUTER GIMBAL, MIDDLE GIMBAL and INNER GIMBAL CDU's shall indicate 0.000 (±0.006°). Record.

10. Enter (and verify) VERB 15, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display shall indicate the contents of X, Y and Z CDU counters in rows 1, 2 and 3 as all zeros prior to entering the first FINE ALIGN mode of the sequence stated in step 6.

NOTE: If rows 1, 2 and 3 do not each indicate 00000, repeat steps 6 and 10 once after the ZERO ENCODER light goes out. If they again do not indicate 00000, the system has failed the test.

11. Enter (and verify) VERB 41, NOUN 20 into G & N AGC DSKY. Press ENTER pushbutton; the VERB-NOUN display shall flash and indicate 21-22.

12. Enter +00000 into G and N AGC DSKY three times pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing after pressing ENTER pushbutton the third time and the COARS ALIGN lamp on the IMU CONTROL panel shall light and the FINE ALIGN lamp shall go out.

13. Monitor IG + $\Delta\theta$ pulses at 45A5J1, pins 23 (high) and 1 (low) using pulse probes on PSA Adapter.

14. Enter (and verify) VERB 25, NOUN 22 into the G and N AGC DSKY. Press ENTER pushbutton. VERB-NOUN display shall flash and indicate 21-22.

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15. Enter +06000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

16. Enter +06000 into G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record second printout of the DIGITAL RECORDER.

NOTE: The GIMBAL LOCK lamps on the Condition Annunciator and MONITOR panel may light. Disregard these lamp indications unless specifically indicated to do otherwise.

17. Monitor MG -$\Delta\theta$ pulses at 45A5J1 pins 32 (high) and 1 (low) using pulse probes on PSA Adapter.

18. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

19. Enter +00000 into G and N AGC DSKY twice pressing the ENTER pushbutton after each entry.

20. Enter +00000 into the G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record the second printout of the DIGITAL RECORDER.

21. Monitor OG + $\Delta\theta$ pulses at 45A5J1, pins 25 (high) and 1 (low) using pulse probes on PSA Adapter.

22. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

23. Enter +06000 into G and N AGC DSKY. Press ENTER pushbutton.

24. Enter +06000 into G and N AGC DSKY. Press the ENTER pushbutton.

25. Enter +06000 into the G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record the second printout of the DIGITAL RECORDER.

26. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

27. Enter address 00007_8 into G& N AGC DSKY. Press ENTER pushbutton. AGC DSKY shall indicate the contents of mode register 3 in row 1 as 50042.

28. Record the IMU-CDU DIFFERENCE meter indications.

29. Measure in phase voltage of the following signals on the PAVM using CROSSBAR CONTROL setting indicated for each signal (CROSSBAR CONTROL is located on PRIMARY SIGNAL SELECTOR):

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IG CDU 1X error	232	56P9 pins 59 (high) and 41 (low)
b. MG CDU 1X error	231	56P9 pins 60 (high) and 43 (low)
c. OG CDU 1X error	230	56P9 pins 77 (high) and 61 (low)
d. IGA 1X sine	144	56P9 pins 1 (S2) and 23 (S4)
e. IGA 1X cosine	243	56P9 pins 2(S1) and 3 (S3)
f. MGA 1X sine	143	56P9 pins 24 (S2) and 42 (S4)
g. MGA 1X cosine	242	56P9 pins 25 (S1) and 44 (S3)
h. OGA 1X sine	142	56P9 pins 4 (S2) and 26 (S4)
i. OGA 1X cosine	241	56P9 pins 45 (S1) and 27 (S3)

30. Measure the phase angle of the following signals with respect to 800~ demod. reference on the PAVM by using the CROSSBAR CONTROL setting indicated for each signal:

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IGA 1X sine	144	56P9 pins 1 (S2) and 23 (S4)
b. MGA 1X sine	143	56P9 pins 24 (S2) and 42 (S4)
c. OGA 1X sine	142	56P9 pins 4 (S2) and 26 (S4)
d. IGA 1X cosine	243	56P9 pins 2 (S1) and 3 (S3)
e. MGA 1X cosine	242	56P9 pins 25 (S1) and 44 (S3)
f. OGA 1X cosine	241	56P9 pins 45 (S1) and 27 (S3)

Record indications.

31. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY.

32. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

33. Enter + 00000 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing.

34. Enter (and verify) VERB 42 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

35. Enter (and verify) 00000 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing and indicate 42-67. The FINE ALIGN mode lamp on the IMU CONTROL panel shall be the only lamp that lights.

36. Monitor in-phase voltage of the following signals on the PAVM using CROSSBAR CONTROL setting indicated for each signal:

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IG CDU 16X error	229	45A6J1 pins 20 (high) and 21 (low)
b. MG CDU 16X error	228	45A6J1 pins 27 (high) and 28 (low)
c. OG CDU 16X error	227	45A6J1 pins 35 (high) and 36 (low)

Record indications.

37. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

38. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate the contents of mode register 3 in row 1 as 50050.

39. Insure that the SCS LOADS ENTRY pushbutton on the TEST CONTROL panel is lighted.

40. Set CROSSBAR CONTROL to 99 and VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

41. Calibrate the PAVM with FREQUENCY control set to 800 ~ #2. Set controls as follows:

FUNCTION to 0°
DEGREES to 0°

42. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton (the ZERO ENC, FINE ALIGN, ATT CONT and FINE ALIGN mode lamps on the IMU CONTROL panel shall light in the sequence stated above). The ZERO ENCODER condition lamp shall remain lighted for

approximately 20 seconds after the system enters the final FINE ALIGN mode of the sequence indicated above.

43. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

44. Enter (and verify) + 00000 into the G and N DSKY. Press ENTER pushbutton.

45. Repeat step 44 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding to step 46.

46. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

47. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

48. Enter (and verify) VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

49. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° + 1.0000° into the G and N AGC DSKY. Press ENTER pushbutton.

50. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

51. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

52. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

53. Monitor Pitch error (θ) on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

54. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

55. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

56. Observe the PAVM and adjust MG CDU thumbwheel until PAVM indicates approximately + 1.5 volts. Insure that increasing angle on CDU results in positive voltage indication.

57. Measure the Yaw body offset error phase angle on PAVM. Record indication (and sign).

58. Observe the PAVM and obtain best possible in-phase null using MG CDU thumbwheel.

59. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

60. Set FUNCTION switch on the PAVM to TOTAL. Measure and

record the PAVM indication.

61. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain -10 mv on 30 mv scale using MG CDU. Note the time interval for the error signal to drift from null to + 15 mv.

NOTE: Read and understand steps 62 through 73 before proceeding. These steps must be accomplished as quickly as possible without interruption.

62. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

63. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

64. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

65. Enter + 50000 into the G and N AGC DSKY. DO NOT press ENTER pushbutton.

66. Observe the PAVM and obtain -20 mv signal on 30 mv scale using MG CDU. When the PAVM passes through -15 mv, start timing the interval obtained in step 61.

67. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Set DVM FUNCTION switch to AC. Press ENTER pushbutton on G and N AGC DSKY.

68. Using dc probes monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low).

69. At the end of the time interval started in step 66, record the DVM indication on the data sheet.

70. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

71. Set DVM to OFF.

72. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

73. Monitor Yaw body offset error ψ_{NB} at 45A7J1, pins 35 (high) and 36 (low) with ac probes on PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

74. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

75. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

76. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

77. Repeat step 76 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

78. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

79. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

80. Enter (and verify) VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

81. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° + 1.0000° into the G and N AGC DSKY. Press ENTER pushbutton.

82. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

83. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

84. Enter (and verify) VERB 43 into G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

85. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

86. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

87. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

88. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

89. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. SCS LOADS NORMAL shall light.

90. Monitor Yaw body error ψ_{SC} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

91. Observe the PAVM and obtain best possible null using OG CDU thumbwheel.

92. Observe the PAVM and adjust the MG CDU thumbwheel until PAVM indicates approximately + 1.25 volts. Insure that increasing angle on CDU results in positive voltage indication.

93. Measure the Yaw body error phase angle on PAVM. Record indication and sign.

94. Observe the PAVM and obtain best possible in-phase null using MG CDU thumbwheel.

95. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

96. Set FUNCTION switch on PAVM to TOTAL. Measure and record the PAVM indication.

97. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain -10 mv on 30 mv scale using MG CDU. Note the time interval for the error signal to

drift from null to + 25 mv.

NOTE: Read and understand steps 98 through 109 before proceeding. These steps must be accomplished as quickly as possible without interruption.

98. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

99. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

100. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

101. Enter + 50000 into G and N AGC DSKY. DO NOT press ENTER pushbutton

102. Observe the PAVM and obtain -30 mv signal on 30 mv scale using MG CDU. When the PAVM passes through -25 mv, start timing the time interval obtained in step 97.

103. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC. Press ENTER pushbutton on G and N AGC DSKY.

104. Using dc probes monitor Yaw body error ψ_{SC} on PSA Adapter Tray 9, pins 34 (high) and 38 (low).

105. At the end of the time interval started in step 104, record the DVM indication on the data sheet.

106. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

107. Set DVM to OFF.

108. Set controls on PAVM as follows:

FUNCTION to 0°

DEGREES to 0°

109. Monitor Yaw body error ψ_{SC} at 45A7J1, pins 7 (high) and 8 (low) with ac probes on PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

110. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

111. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

112. Depending upon the test site location, enter (and verify) the appropriate angle into the G and N AGC DSKY. (See chart below). Press ENTER pushbutton.

SITE LOCATION	Angle
ACSP	+ 07540
NAA	+ 06643
AMR	+ 0----
MIT	+ 07487
MSC	+ 06206

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113. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 60 seconds before proceeding.

114. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

115. Enter (and verify) + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

116. Repeat step 115 twice.

CAUTION: During the following step, exercise adequate care to prevent damaging strain to connecting cables.

117. Observe the IG CDU indicator and carefully tilt the G and N Mounting Fixture until the IG CDU indicator reads 000.00°. Insure that at least 90 seconds have elapsed since performing step 116 before proceeding.

118. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

119. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

120. Enter (and verify) + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

121. Repeat step 120 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

122. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

123. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry.

124. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS ENTRY pushbutton shall light.

125. Using ac probes monitor Roll body offset error ϕ_{NB} on PSA Adapter Tray 9, pins 35 (high) and 38 (low).

126. After at least 90 seconds have elapsed since performing step 123, enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

127. Observe the OG CDU indications as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

128. Enter + 00000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry. Enter (and verify) VERB 21, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton. Enter (and verify) 00713 and press ENTER pushbutton. Enter (and verify) 37777 and press ENTER pushbutton.

129. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

130. Enter (and verify) + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

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131. Enter (and verify) +00000 into the G and N AGC DSKY. Press ENTER pushbutton.

132. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton. The ENTRY Mode lamp on the IMU CONTROL panel shall be the only mode lamp that lights.

133. Using OG CDU thumbwheel, adjust OG CDU until a null is obtained on the .01 volt scale of PAVM. Record OG CDU indication on calculation sheet.

134. Release thumbwheel of OG CDU and record OG CDU indication on calculation sheet.

135. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton.

136. Algebraically subtract indication of step 134 from indication of step 133 and enter (and verify) the result into the G and N AGC DSKY as ±XXX.XX degrees. Press ENTER pushbutton.

137. Enter (and verify) +00000 into G and N AGC DSKY twice. Press ENTER pushbutton after each entry.

NOTE: PAVM indication will oscillate. Determine peak to peak excursion and choose midpoint of excursion when making measurements in steps 138 and 144.

138. Observe PAVM indication on .1 volt scale. If indication remains on scale, record value and sign of midpoint of excursions on calculation sheet. If INDICATION DOES NOT remain fully on scale, repeat steps 136 through 138 adjusting the DSKY ENTRY of step 136 slightly until indication does stay on scale, and then record midpoint.

NOTE: Changing DSKY entry by ±000.01 will change reading by 0.048 volts.

139. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 235 to measure OGA 16X error at 56P9 pins 27 (high) and 26 (low) on the PAVM. Record midpoint of excursion on calculation sheet. (The PAVM voltage scale setting may be changed if necessary.) Return CROSSBAR CONTROL to 199.

140. Algebraically add +00031 to indication in row 1 of AGC DSKY.

141. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton. Enter result of addition in step 140 into G and N AGC DSKY as ±XXXXX. Press ENTER pushbutton.

142. Enter +00000 into G and N AGC DSKY twice, pressing the ENTER pushbutton after each entry. Wait 20 seconds before proceeding.

143. Record the indication and sign on 3 volt scale of PAVM on calculation sheet.

144. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 235 and record PAVM indication and sign on calculation sheet. Return CROSSBAR CONTROL to 199.

145. Monitor Roll body offset error ϕ_{NB} at 45A7J1, pins 27 (high) and 28 (low) using ac probes on the PSA Adapter. Record PAVM indication on calculation sheet and verify that indication is positive.

146. Monitor Roll body offset error ϕ_{NB} on PSA Adapter Tray 9, pins 35 (high) and 38 (low) using ac probes. Verify that PAVM indication is positive.

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147. Measure Roll body offset error phase angle on PAVM. Record indication and sign.

148. Use the OUTER GIMBAL CDU thumbwheel to obtain a fine null on the 0.003 scale of PAVM. Drift may be observed on PAVM. Obtain best possible null and then hold thumbwheel in subsequent steps 149 and 150.

149. Set FUNCTION switch on PAVM to 90°. Measure and record the PAVM indication (and sign).

150. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication. Release the thumbwheel.

151. Algebraically subtract indication recorded in step 138 from that recorded in step 143 on calculation sheet. Record result on data sheet.

152. Algebraically subtract indication recorded in step 139 from that recorded in step 144 on calculation sheet. Record result on data sheet.

153. Enter VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

154. Enter address 00007_8 into G and N AGC DSKY. AGC display shall indicate contents of mode register 3 in row 1 as 50140.

155. Set controls on PAVM as follows:

FUNCTION to 0°

DEGREES to 0°

156. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

157. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

158. Enter (and verify) -03250 into the G and N AGC DSKY. Press ENTER pushbutton.

159. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 60 seconds.

160. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

161. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

162. Repeat step 161 twice.

CAUTION: During the following step, exercise adequate care to prevent damaging strain to connecting cables.

163. Observe the IG CDU indicator and carefully tilt the G and N Mounting Fixture until the IG CDU indicator reads 000.00°.

164. After at least 90 seconds has elapsed since performing step 162 enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

165. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

166. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

167. Observe the MG CDU indication as

±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

168. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

169. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

170. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

171. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

172. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

173. Monitor Roll body error ϕ_{SC} on PSA Adapter Tray 9, pins 35 (high) and 38 (low) with ac probes.

174. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS NORMAL pushbutton shall light.

175. Observe the PAVM and adjust OG CDU thumbwheel until PAVM indicates approximately + 1.25 volts. Insure that increasing angle on CDU results in positive voltage indication.

176. Measure the Roll body error phase angle on PAVM and let PAVM degrees dial remain at this indication. Record indication (and sign).

177. Observe the PAVM and obtain best possible in-phase null using OG CDU thumbwheel.

178. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

179. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication.

NOTE: Perform steps 180 thru 188 as quickly as possible.

180. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain best possible null on 10 mv scale using OG CDU.

181. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC.

182. Using dc probes monitor Roll body error ϕ_{SC} on PSA Adapter Tray 9, pins 35 (high) and 38 (low).

183. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

184. Enter + 50000 into the G and N AGC DSKY. Press ENTER pushbutton.

185. Enter + 00000 into the G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

186. Record the DVM indication

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on the data sheet.

187. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR. Set DVM to OFF.

188. Set controls on PAVM as follows:
FUNCTION to 0°
DEGREES to 0°

189. Monitor Roll body error ϕ_{SC} at 45A7J1, pins 14 (high) and 15 (low) using ac probes on PSA Adapter. Verify that PAVM indication is positive and record value on calculation sheet.

190. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

191. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

192. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

193. Repeat step 192 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

194. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

195. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

196. Enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

197. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

198. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

199. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

200. Enter (and verify) VERB 43 into G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

201. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS ENTRY pushbutton shall light.

202. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

203. Observe the PAVM and obtain best possible null on 30 mv scale using MG CDU thumbwheel.

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204. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

205. Observe the PAVM and adjust the IG CDU thumbwheel until PAVM indicates approximately + 1.5 volts. Insure that increasing angle on CDU results in positive voltage indication.

206. Measure the Pitch error phase angle on the PAVM and let PAVM degrees dial remain at this indication. Record indication (and sign).

207. Observe the PAVM and obtain best possible in-phase null using IG CDU thumbwheel.

208. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

209. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication.

NOTE: Perform steps 210 thru 220 as quickly as possible.

210. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain best possible null on 10 mv scale using IG CDU.

211. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC.

212. Using dc probes monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low).

213. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

214. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

215. Enter + 50000 into the G and N AGC DSKY. Press ENTER pushbutton.

216. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

217. Record the DVM indication on the data sheet.

218. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR. Set DVM to OFF.

219. Set controls on PAVM as follows:
FUNCTION to 0°
DEGREES to 0°

220. Monitor Pitch error θ at 45A7J1, pins 20 (high) and 21 (low) with ac probes on the PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

221. Enter (and verify) VERB 41, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

222. Enter + 09000 into G and N AGC DSKY. Press ENTER pushbutton.

223. Enter + 00000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry. Wait at least 60 seconds before proceeding.

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224. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton.

225. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) using ac probes.

226. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

227. Enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

228. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

229. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

230. Enter + 50000 into G and N AGC DSKY. Press ENTER pushbutton.

231. Verify that the PAVM indication is positive (approximately + 1.5 volts).

232. Enter (and verify) VERB 41, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

233. Enter + 00000 into G and N AGC DSKY three times pressing ENTER pushbutton after each entry. Wait at least 60 seconds before proceeding.

234. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

235. Enter + 00000 into G and N AGC DSKY three times pressing the ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding. Repeat steps 196 thru 199.

236. Enter (and verify) VERB 44 (ATTITUDE CONTROL mode) into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-23.

237. Enter +00500 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The ATT CONT lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

238. Record INNER IMU CDU DIFFERENCE meter indication.

239. Record MIDDLE IMU CDU DIFFERENCE meter indication.

240. Record OUTER IMU CDU DIFFERENCE meter indication.

241. Enter (and verify) VERB 11, NOUN 01 into the G and N AGC DSKY. Press ENTER pushbutton.

242. Enter 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate contents of mode register 3 in row 1 as 50060.

243. Enter VERB 42, NOUN 67 into G and N AGC DSKY. Press ENTER pushbutton.

244. Enter VERB 33 in G and N AGC DSKY. Press ENTER pushbutton. Wait at least 90 seconds.

245. Enter (and verify) VERB 41, NOUN 20

into G and N AGC DSKY. Press ENTER pushbutton. The G and N AGC DSKY shall flash and indicate 21-22.

246. Enter (and verify) VERB 33 into G and N AGC DSKY. Press ENTER pushbutton.

247. Enter (and verify) VERB 33 into G and N AGC DSKY. Press ENTER pushbutton. The COARS ALIGN mode lamp on the IMU CONTROL panel is the only mode lamp that is lighted.

248. Pressing of any of the mode pushbuttons on the IMU CONTROL panel shall not cause any of the mode lamps to light or go out.

249. Tilt the G and N Mounting Fixture to the 32.5 ± 0.5 degree position.

250. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 73}}{\text{Magnitude of step 69}}$$

Record on data sheet.

251. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 109}}{\text{Magnitude of step 105}}$$

Record on data sheet.

252. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 145}}{\text{Magnitude of step 143}}$$

Record on data sheet.

253. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 189}}{\text{Magnitude of step 186}}$$

Record on data sheet.

254. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 220}}{\text{Magnitude of step 217}}$$

Record on data sheet.

255. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 105}}{\text{Magnitude of step 69}}$$

Record on data sheet.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 6

NO. 10084 JDC
REV. C
INITIAL TDRR 21539

JOB AGC MODE CONTROL TEST

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
9	OUTER GIMBAL CDU	deg	-0.006				+0.006		
9	MIDDLE GIMBAL CDU	deg	-0.006				+0.006		
9	INNER GIMBAL CDU	deg	-0.006				+0.006		
16	IG time	sec	0				5.0		
20	MG time	sec	0				5.0		
25	OG time	sec	0				5.0		
28	IG IMU CDU DIFF	deg	-1.0				+1.0		
28	MG IMU CDU DIFF	deg	-1.0				+1.0		
28	OG IMU CDU DIFF	deg	-1.0				+1.0		
29a	IG CDU 1X error	mv rms	0				150		
29b	MG CDU 1X error	mv rms	0				150		
29c	OG CDU 1X error	mv rms	0				150		
29d	IGA 1X-sine	volts rms	20.25				24.75		
29e	IGA 1X cosine	volts rms	11.7				14.3		

* TO BE USED AS REQUIRED OR DESIRED

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 6

JDC
NO. 10084
REV. C

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
29f	MGA 1X sine	volts rms	20.25				24.75		
29g	MGA 1X cosine	volts rms	11.7				14.3		
29h	OGA 1X sine	volts rms	20.25				24.75		
29i	OGA 1X cosine	volts rms	11.7				14.3		
30a	MGA 1X sine	deg	+1.0				+11.0		
30b	MGA 1X sine	deg	+1.0				+11.0		
30c	OGA 1X sine	deg	+1.0				+11.0		
30d	IGA 1X cosine	deg	+1.0				+11.0		
30e	MGA 1X cosine	deg	+1.0				+11.0		
30f	OGA 1X cosine	deg	+1.0				+11.0		
36a	IG CDU 16X error **	mv rms	-24.0				+24.0		
36b	MG CDU 16X error **	mv rms	-24.0				+24.0		
36c	OG CDU 16X error **	mv rms	-24.0				+24.0		
57	Yaw error ψ_{NB} Phase Shift	deg	-5.5				+5.5		
59	Yaw error ψ_{NB} Quad**	mv rms	-124				+124		
60	Yaw error ψ_{NB} Total**	mv rms	0				125		

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using the 'MULT BY' factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 **OF** 6

JDC
NO. 10084
REV. C

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
69	Yaw body offset error ψ_{NB} (S/C)	volts rms	1.42				1.58		
93	Yaw error ψ_{SC} Phase Angle	deg	-5.5				+5.5		
95	Yaw error ψ_{SC} Quad.**	mv rms	-124				+124		
96	Yaw error ψ_{SC} Total**	mv rms	0				125		
105	Yaw body error ψ_{SC} (S/C)	volts rms	1.19				1.33		
147	Roll error ϕ_{NB} Phase Shift	deg	-5.5				+5.5		
149	Roll error ϕ_{NB} Quad.**	mv rms	-124				+124		
150	Roll error ϕ_{NB} Total**	mv rms	0				125		
151	Roll body offset error ϕ_{NB}(S/C)**	volts rms	+1.35				+1.65		
152	OGA 16X error	volts	-2.05				-2.51		
176	Roll error ϕ_{SC} Phase angle	deg	-5.5				+5.5		
178	Roll error ϕ_{SC} Quad.**	mv rms	-124				+124		
179	Roll error ϕ_{SC} Total**	mv rms	0				125		
186	Roll body error ϕ_{SC} (S/C)	volts	1.19				1.33		
206	Pitch error θ Phase Angle	deg	-8.9				+2.3		

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using the 'MULT BY' factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 6

JDC
NO. 10084
REV. C

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
208	Pitch error θ Quad.**	mv rms	-124				+124		
209	Pitch error θ Total**	mv rms	0				125		
217	Pitch body & offset Error θ (S/C)	volts rms	1.42				1.58		
238	IG IMU CDU DIFF	deg	-4.0				-5.0		
239	MG IMU CDU DIFF	deg	-4.0				-5.0		
240	OG IMU CDU DIFF	deg	-4.0				-5.0		
250	Yaw body offset Error ratio		0.9				1.1		
251	Yaw body Error ratio		0.9				1.1		
252	Roll body offset Error ratio		0.9				1.1		
253	Roll body error ratio		0.9				1.1		
254	Pitch error ratio		0.9				1.1		
255	Yaw body to yaw offset error ratio		0.797				0.881		
	G&N AGC DSKY displays			DSKY displays were in accordance with those specified throughout the JDC.					
	G&N lamp displays			Lamp displays were in accordance with those specified throughout the JDC.					

* TO BE USED AS REQUIRED OR DESIRED
**Correct this measurement using the 'MULT BY' factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 6

JDC
NO. 10084
REV. C

JOB AGC MODE CONTROL TEST

CALCULATION				
JDC ITEM NUMBER	PARAMETER	SIGN	VALUE	UNITS
73	Yaw body offset error ψ_{NB} (5°) (PSA)	+		volts rms
109	Yaw body error ψ_{SC} (5°) (PSA)	+		volts rms
133	OG CDU			degrees
134	OG CDU			degrees
138				volts rms
139				volts rms
143				volts rms
144				volts rms
145	Roll body offset error ϕ_{NB} (5°) (PSA)	+		volts rms
151	(Step 143 above) - (sign and magnitude of step 138 above)			volts rms
152	(Step 144 above) - (Sign and magnitude of step 139 above)			volts rms
189	Roll body error ϕ_{SC} (5°) (PSA)	+		volts rms
220	Pitch error θ (5°) (PSA)	+		volts rms
250	(Step 73 above) ÷ (Step 69)	+		
251	(Step 109 above) ÷ (Step 105)	+		
252	(Step 145 above) ÷ (Step 143)	+		

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 6

JDC
NO. 10084
REV. C

JOB AGC MODE CONTROL TEST

CALCULATION				
JDC ITEM NUMBER	PARAMETER	SIGN	VALUE	UNITS
253	(Step 189 above) ÷ (Step 186)	+		
254	(Step 220 above) ÷ (Step 217)	+		
255	(Step 105) ÷ (Step 69)	+		

DATE 12 AUG 65

JOB AGC MODE CONTROL TEST

JDC 10084 **REV.** D **PAGE** 1 **OF** 17

INITIAL TDRR 21539 **D.S. PGS** 6

SUBSYSTEM G AND N SYSTEM

ASSY.

DESCRIPTION The G and N System is sequenced through its operating modes using the computer to initialize each mode. Visual displays of the modes are verified on IMU CONTROL panel and AGC display of mode register 3 as well as spacecraft, PSA front panel and telemetry interface.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-21-65	22662	12, 16	-	WK	ACM
B	11-3-65	23738	All	All	WK	ACM
C	11-23-65	24261	5	-	WK	-
D	5-6-66	28585	1, 9, 13	2, 3, 4	MM	ACM

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.3.1, 3-3.4.3.3, 3-3.8.2.1, 3-3.11.1.6 through 3-3.11.1.10, 3-3.11.2.62, 3-3.11.3.66, 3-3.11.2.67, 3-3.11.2.121 and 3-3.11.3.43 through 3-3.11.3.51, 3-3.11.2.82 through 3-3.11.2.84, 3-3.11.2.87 through 3-3.11.2.91, and 3-3.11.3.68 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. Those signals listed on the Data Sheet which are starred (**) must be corrected by the multiplication factor to obtain the true value.

1. Tilt G & N Mounting Fixture 32.5 ± 0.5 degrees.

2. Insure that TRANSFER switch on IMU CONTROL panel is set to COMPUTER.

3. Insure that TRACKER POWER switch on G & N indicator control panel is set to OFF and optics mode selector is set to MANUAL.

4. Set following switches on PRIMARY SIGNAL SELECTOR panel:

COUNTER INPUT "D" PULSE to 13

D SIGNAL/D PULSE pushbutton - "D" PULSE lighted

5. Set switches and controls on COUNTER as follows:

SAMPLE TIME (N_1) to 002048

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 AUG 65

JOB AGC MODE CONTROL TEST

JDC 10084 **REV** D **PAGE** 2 **OF** 17

SUBSYSTEM G AND N SYSTEM

ASSY

CLOCK FREQUENCY DIVIDER to 1

CLOCK SELECTOR to INT

FUNCTION to RATIO OR PERIOD

INPUT SELECTOR to C SENSE

SENSE SELECTOR to FWD

ATTN D to 10AC

SLOPE to ·

TRIGGER VOLTAGE as required

NOTE: Read and understand steps 6 through 10 before proceeding. Perform steps 7 through 10 within 40 seconds after initiating step 6.

6. Enter (and verify) VERB 40, NOUN 20 (ZERO ENC mode) into G and N AGC DSKY. Press ENTER pushbutton. (The ZERO ENC, FINE ALIGN, ATT CONT and FINE ALIGN mode lamps on IMU CONTROL panel shall light in sequence stated above.) The ZERO ENCODER condition lamp shall remain lighted for approximately 20 seconds after the system enters the final FINE ALIGN mode of the sequence indicated above.

7. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

8. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate the contents of mode register 3 in row 1 as 50051.

9. The OUTER GIMBAL, MIDDLE GIMBAL and INNER GIMBAL CDU's shall indicate 0.000 (±0.006°). Record.

10. Enter (and verify) VERB 15, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display shall indicate the contents of X, Y and Z CDU counters in rows 1, 2 and 3 as all zeros prior to entering the first FINE ALIGN mode of the sequence stated in step 6.

NOTE: If rows 1, 2 and 3 do not each indicate 00000, repeat steps 6 and 10 once after the ZERO ENCODER light goes out. If they again do not indicate 00000, the system has failed the test.

11. Enter (and verify) VERB 41, NOUN 20 into G & N AGC DSKY. Press ENTER pushbutton; the VERB-NOUN display shall flash and indicate 21-22.

12. Enter +00000 into G and N AGC DSKY three times pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing after pressing ENTER pushbutton the third time and the COARS ALIGN lamp on the IMU CONTROL panel shall light and the FINE ALIGN lamp shall go out.

13. Monitor IG + Δθ pulses at 45A5J1, pins 23 (high) and 1 (low) using pulse probes on PSA Adapter.

14. Enter (and verify) VERB 25, NOUN 22 into the G and N AGC DSKY. Press ENTER

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SUBSYSTEM G AND N SYSTEM

ASSY

pushbutton. VERB-NOUN display shall flash and indicate 21-22.

15. Enter +06000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

16. Enter +06000 into G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record second printout of the DIGITAL RECORDER.

NOTE: The GIMBAL LOCK lamps on the Condition Annunciator and MONITOR panel may light. Disregard these lamp indications unless specifically indicated to do otherwise.

17. Monitor MG -Δθ pulses at 45A5J1 pins 32 (high) and 1 (low) using pulse probes on PSA Adapter.

18. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

19. Enter +00000 into G and N AGC DSKY twice pressing the ENTER pushbutton after each entry.

20. Enter +00000 into the G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record the second printout of the DIGITAL RECORDER.

21. Monitor OG + Δθ pulses at 45A5J1, pins 25 (high) and 1 (low) using pulse probes on PSA Adapter.

22. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

23. Enter +06000 into G and N AGC DSKY. Press ENTER pushbutton.

24. Enter +06000 into G and N AGC DSKY. Press the ENTER pushbutton.

25. Enter +06000 into the G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record the second printout of the DIGITAL RECORDER.

26. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

27. Enter address 00007_8 into G& N AGC DSKY. Press ENTER pushbutton. AGC DSKY shall indicate the contents of mode register 3 in row 1 as 50042.

28. Record the IMU-CDU DIFFERENCE meter indications.

29. Measure in phase voltage of the following signals on the PAVM using CROSSBAR CONTROL setting indicated for each signal (CROSSBAR CONTROL is located on PRIMARY SIGNAL SELECTOR):

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SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IG CDU 1X error	232	56P9 pins 59 (high) and 41 (low)
b. MG CDU 1X error	231	56P9 pins 60 (high) and 43 (low)
c. OG CDU 1X error	230	56P9 pins 77 (high) and 61 (low)
d. IGA 1X sine	144	56P9 pins 1 (S2) and 23 (S4)
e. IGA 1X cosine	243	56P9 pins 2(S1) and 3 (S3)
f. MGA 1X sine	143	56P9 pins 24 (S2) and 42 (S4)
g. MGA 1X cosine	242	56P9 pins 25 (S1) and 44 (S3)
h. OGA 1X sine	142	56P9 pins 4 (S2) and 26 (S4)
i. OGA 1X cosine	241	56P9 pins 45 (S1) and 27 (S3)

30. Measure the phase angle of the following signals with respect to 800~ demod. reference on the PAVM by using the CROSSBAR CONTROL setting indicated for each signal:

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IGA 1X sine	144	56P9 pins 1 (S2) and 23 (S4)
b. MGA 1X sine	143	56P9 pins 24 (S2) and 42 (S4)
c. OGA 1X sine	142	56P9 pins 4 (S2) and 26 (S4)
d. IGA 1X cosine	243	56P9 pins 2 (S1) and 3 (S3)
e. MGA 1X cosine	242	56P9 pins 25 (S1) and 44 (S3)
f. OGA 1X cosine	241	56P9 pins 45 (S1) and 27 (S3)

Record indications.

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31. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY.

32. Press ENTER pushbutton on G and N AGC DSKY The VERB-NOUN display shall flash and indicate 21-22.

33. Enter + 00000 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing.

34. Enter (and verify) VERB 42 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

35. Enter (and verify) 00000 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing and indicate 42-67. The FINE ALIGN mode lamp on the IMU CONTROL panel shall be the only lamp that lights.

36. Monitor in-phase voltage of the following signals on the PAVM using CROSSBAR CONTROL setting indicated for each signal:

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IG CDU 16X error	229	45A6J1 pins 20 (high) and 21 (low)
b. MG CDU 16X error	228	45A6J1 pins 27 (high) and 28 (low)
c. OG CDU 16X error	227	45A6J1 pins 35 (high) and 36 (low)

Record indications.

37. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

38. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate the contents of mode register 3 in row 1 as 50050.

39. Insure that the SCS LOADS ENTRY pushbutton on the TEST CONTROL panel is lighted.

40. Set CROSSBAR CONTROL to 99 and VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

41. Calibrate the PAVM with FREQUENCY control set to 800 ~ #2. Set controls as follows:

FUNCTION to 0°
DEGREES to 0°

42. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton (the ZERO ENC, FINE ALIGN, ATT CONT and FINE ALIGN mode lamps on the IMU CONTROL panel shall light in the sequence stated above). The ZERO ENCODER condition lamp shall remain lighted for

approximately 20 seconds after the system enters the final FINE ALIGN mode of the sequence indicated above.

43. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

44. Enter (and verify) + 00000 into the G and N DSKY. Press ENTER pushbutton.

45. Repeat step 44 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding to step 46.

46. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

47. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

48. Enter (and verify) VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

49. Observe the OG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° + 1. 0000° into the G and N AGC DSKY. Press ENTER pushbutton.

50. Observe the IG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

51. Observe the MG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

52. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

53. Monitor Pitch error (θ) on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

54. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

55. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

56. Observe the PAVM and adjust MG CDU thumbwheel until PAVM indicates approximately + 1. 5 volts. Insure that increasing angle on CDU results in positive voltage indication.

57. Measure the Yaw body offset error phase angle on PAVM. Record indication (and sign).

58. Observe the PAVM and obtain best possible in-phase null using MG CDU thumbwheel.

59. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

60. Set FUNCTION switch on the PAVM to TOTAL. Measure and

record the PAVM indication.

61. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain -10 mv on 30 mv scale using MG CDU. Note the time interval for the error signal to drift from null to + 15 mv.

NOTE: Read and understand steps 62 through 73 before proceeding. These steps must be accomplished as quickly as possible without interruption.

62. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

63. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

64. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

65. Enter + 50000 into the G and N AGC DSKY. DO NOT press ENTER pushbutton.

66. Observe the PAVM and obtain -20 mv signal on 30 mv scale using MG CDU. When the PAVM passes through -15 mv, start timing the interval obtained in step 61.

67. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Set DVM FUNCTION switch to AC. Press ENTER pushbutton on G and N AGC DSKY.

68. Using dc probes monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low).

69. At the end of the time interval started in step 66, record the DVM indication on the data sheet.

70. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

71. Set DVM to OFF.

72. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

73. Monitor Yaw body offset error ψ_{NB} at 45A7J1, pins 35 (high) and 36 (low) with ac probes on PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

74. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

75. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

76. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

77. Repeat step 76 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

78. Enter (and verify) VERB 42 into the G

and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

79. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

80. Enter (and verify) VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

81. Observe the OG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° + 1. 0000° into the G and N AGC DSKY. Press ENTER pushbutton.

82. Observe the IG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

83. Observe the MG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

84. Enter (and verify) VERB 43 into G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

85. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

86. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

87. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

88. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

89. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. SCS LOADS NORMAL shall light.

90. Monitor Yaw body error ψ_{SC} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

91. Observe the PAVM and obtain best possible null using OG CDU thumbwheel.

92. Observe the PAVM and adjust the MG CDU thumbwheel until PAVM indicates approximately + 1. 25 volts. Insure that increasing angle on CDU results in positive voltage indication.

93. Measure the Yaw body error phase angle on PAVM. Record indication and sign.

94. Observe the PAVM and obtain best possible in-phase null using MG CDU thumbwheel.

95. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

96. Set FUNCTION switch on PAVM to TOTAL. Measure and record the PAVM indication.

97. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain -10 mv on 30 mv scale using MG CDU. Note the time interval for the error signal to

drift from null to + 25 mv.

NOTE: Read and understand steps 98 through 109 before proceeding. These steps must be accomplished as quickly as possible without interruption.

98. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

99. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

100. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

101. Enter + 50000 into G and N AGC DSKY. DO NOT press ENTER pushbutton

102. Observe the PAVM and obtain -30 mv signal on 30 mv scale using MG CDU. When the PAVM passes through -25 mv, start timing the time interval obtained in step 97.

103. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC. Press ENTER pushbutton on G and N AGC DSKY.

104. Using dc probes monitor Yaw body error ψ_{SC} on PSA Adapter Tray 9, pins 34 (high) and 38 (low).

105. At the end of the time interval started in step 104, record the DVM indication on the data sheet.

106. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

107. Set DVM to OFF.

108. Set controls on PAVM as follows:

FUNCTION to 0°

DEGREES to 0°

109. Monitor Yaw body error ψ_{SC} at 45A7J1, pins 7 (high) and 8 (low) with ac probes on PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

110. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

111. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

112. Depending upon the test site location, enter (and verify) the appropriate angle into the G and N AGC DSKY. (See chart below). Press ENTER pushbutton.

SITE LOCATION	Angle
ACSP	+ 07540
NAA	+ 06643
MILA	+ 06101
MIT	+ 07187
MSC	+ 06206

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113. Enter (and verify) +00000 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 60 seconds before proceeding.

114. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

115. Enter (and verify) + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

116. Repeat step 115 twice.

CAUTION: During the following step, exercise adequate care to prevent damaging strain to connecting cables.

117. Observe the IG CDU indicator and carefully tilt the G and N Mounting Fixture until the IG CDU indicator reads 000.00°. Insure that at least 90 seconds have elapsed since performing step 116 before proceeding.

118. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

119. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

120. Enter (and verify) + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

121. Repeat step 120 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

122. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

123. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry.

124. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS ENTRY pushbutton shall light.

125. Using ac probes monitor Roll body offset error ϕ_{NB} on PSA Adapter Tray 9, pins 35 (high) and 38 (low).

126. After at least 90 seconds have elapsed since performing step 123, enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

127. Observe the OG CDU indications as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

128. Enter + 00000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry. Enter (and verify) VERB 21, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton. Enter (and verify) 00713 and press ENTER pushbutton. Enter (and verify) 37777 and press ENTER pushbutton.

129. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

130. Enter (and verify) + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

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131. Enter (and verify) +00000 into the G and N AGC DSKY. Press ENTER pushbutton.

132. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton. The ENTRY Mode lamp on the IMU CONTROL panel shall be the only mode lamp that lights.

133. Using OG CDU thumbwheel, adjust OG CDU until a null is obtained on the .01 volt scale of PAVM. Record OG CDU indication on calculation sheet.

134. Release thumbwheel of OG CDU and record OG CDU indication on calculation sheet.

135. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton.

136. Algebraically subtract indication of step 134 from indication of step 133 and enter (and verify) the result into the G and N AGC DSKY as ±XXX.XX degrees. Press ENTER pushbutton.

137. Enter (and verify) +00000 into G and N AGC DSKY twice. Press ENTER pushbutton after each entry.

NOTE: PAVM indication will oscillate. Determine peak to peak excursion and choose midpoint of excursion when making measurements in steps 138 and 144.

138. Observe PAVM indication on .1 volt scale. If indication remains on scale, record value and sign of midpoint of excursions on calculation sheet. If INDICATION DOES NOT remain fully on scale, repeat steps 136 through 138 adjusting the DSKY ENTRY of step 136 slightly until indication does stay on scale, and then record midpoint.

NOTE: Changing DSKY entry by ±000.01 will change reading by 0.048 volts.

139. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 235 to measure OGA 16X error at 56P9 pins 27 (high) and 26 (low) on the PAVM. Record midpoint of excursion on calculation sheet. (The PAVM voltage scale setting may be changed if necessary.) Return CROSSBAR CONTROL to 199.

140. Algebraically add +00031 to indication in row 1 of AGC DSKY.

141. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton. Enter result of addition in step 140 into G and N AGC DSKY as ±XXXXX. Press ENTER pushbutton.

142. Enter +00000 into G and N AGC DSKY twice, pressing the ENTER pushbutton after each entry. Wait 20 seconds before proceeding.

143. Record the indication and sign on 3 volt scale of PAVM on calculation sheet.

144. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 235 and record PAVM indication and sign on calculation sheet. Return CROSSBAR CONTROL to 199.

145. Monitor Roll body offset error ϕ_{NB} at 45A7J1, pins 27 (high) and 28 (low) using ac probes on the PSA Adapter. Record PAVM indication on calculation sheet and verify that indication is positive.

146. Monitor Roll body offset error ϕ_{NB} on PSA Adapter Tray 9, pins 35 (high) and 38 (low) using ac probes. Verify that PAVM indication is positive.

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147. Measure Roll body offset error phase angle on PAVM. Record indication and sign.

148. Use the OUTER GIMBAL CDU thumbwheel to obtain a fine null on the 0.003 scale of PAVM. Drift may be observed on PAVM. Obtain best possible null and then hold thumbwheel in subsequent steps 149 and 150.

149. Set FUNCTION switch on PAVM to 90°. Measure and record the PAVM indication (and sign).

150. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication. Release the thumbwheel.

151. Algebraically subtract indication recorded in step 138 from that recorded in step 143 on calculation sheet. Record result on data sheet.

152. Algebraically subtract indication recorded in step 139 from that recorded in step 144 on calculation sheet. Record result on data sheet.

153. Enter VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

154. Enter address 00007_8 into G and N AGC DSKY. AGC display shall indicate contents of mode register 3 in row 1 as 50140.

155. Set controls on PAVM as follows:

FUNCTION to 0°

DEGREES to 0°

156. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

157. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

158. Enter (and verify) -03250 into the G and N AGC DSKY. Press ENTER pushbutton.

159. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 60 seconds.

160. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

161. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

162. Repeat step 161 twice.

CAUTION: During the following step, exercise adequate care to prevent damaging strain to connecting cables.

163. Observe the IG CDU indicator and carefully tilt the G and N Mounting Fixture until the IG CDU indicator reads 000.00°.

164. After at least 90 seconds has elapsed since performing step 162 enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

165. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

166. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

167. Observe the MG CDU indication as

±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

168. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

169. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

170. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

171. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

172. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

173. Monitor Roll body error ϕ_{SC} on PSA Adapter Tray 9, pins 35 (high) and 38 (low) with ac probes.

174. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS NORMAL pushbutton shall light.

175. Observe the PAVM and adjust OG CDU thumbwheel until PAVM indicates approximately + 1.25 volts. Insure that increasing angle on CDU results in positive voltage indication.

176. Measure the Roll body error phase angle on PAVM and let PAVM degrees dial remain at this indication. Record indication (and sign).

177. Observe the PAVM and obtain best possible in-phase null using OG CDU thumbwheel.

178. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

179. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication.

NOTE: Perform steps 180 thru 189 as quickly as possible.

180. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain best possible null on 10 mv scale using OG CDU.

181. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC.

182. Using dc probes monitor Roll body error ϕ_{SC} on PSA Adapter Tray 9, pins 35 (high) and 38 (low).

183. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

184. Enter + 50000 into the G and N AGC DSKY. Press ENTER pushbutton.

185. Enter + 00000 into the G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

186. Record the DVM indication

on the data sheet.

187. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR. Set DVM to OFF.

188. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

189. Monitor Roll body error ϕ_{SC} at 45A7J1, pins 14 (high) and 15 (low) using ac probes on PSA Adapter. Verify that PAVM indication is positive and record value on calculation sheet.

190. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

191. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

192. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

193. Repeat step 192 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

194. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

195. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

196. Enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

197. Observe the OG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

198. Observe the IG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

199. Observe the MG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

200. Enter (and verify) VERB 43 into G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

201. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS ENTRY pushbutton shall light.

202. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

203. Observe the PAVM and obtain best possible null on 30 mv scale using MG CDU thumbwheel.

204. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

205. Observe the PAVM and adjust the IG CDU thumbwheel until PAVM indicates approximately + 1.5 volts. Insure that increasing angle on CDU results in positive voltage indication.

206. Measure the Pitch error phase angle on the PAVM and let PAVM degrees dial remain at this indication. Record indication (and sign).

207. Observe the PAVM and obtain best possible in-phase null using IG CDU thumbwheel.

208. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

209. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication.

NOTE: Perform steps 210 thru 220 as quickly as possible.

210. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain best possible null on 10 mv scale using IG CDU.

211. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC.

212. Using dc probes monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low).

213. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

214. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

215. Enter + 50000 into the G and N AGC DSKY. Press ENTER pushbutton.

216. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

217. Record the DVM indication on the data sheet.

218. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR. Set DVM to OFF.

219. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

220. Monitor Pitch error θ at 45A7J1, pins 20 (high) and 21 (low) with ac probes on the PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

221. Enter (and verify) VERB 41, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

222. Enter + 09000 into G and N AGC DSKY. Press ENTER pushbutton.

223. Enter + 00000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry. Wait at least 60 seconds before proceeding.

224. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton.

225. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) using ac probes.

226. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

227. Enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

228. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

229. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

230. Enter + 50000 into G and N AGC DSKY. Press ENTER pushbutton.

231. Verify that the PAVM indication is positive (approximately + 1.5 volts).

232. Enter (and verify) VERB 41, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

233. Enter + 00000 into G and N AGC DSKY three times pressing ENTER pushbutton after each entry. Wait at least 60 seconds before proceeding.

234. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

235. Enter + 00000 into G and N AGC DSKY three times pressing the ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding. Repeat steps 196 thru 199.

236. Enter (and verify) VERB 44 (ATTITUDE CONTROL mode) into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-23.

237. Enter +00500 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The ATT CONT lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

238. Record INNER IMU CDU DIFFERENCE meter indication.

239. Record MIDDLE IMU CDU DIFFERENCE meter indication.

240. Record OUTER IMU CDU DIFFERENCE meter indication.

241. Enter (and verify) VERB 11, NOUN 01 into the G and N AGC DSKY. Press ENTER pushbutton.

242. Enter 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate contents of mode register 3 in row 1 as 50060.

243. Enter VERB 42, NOUN 67 into G and N AGC DSKY. Press ENTER pushbutton.

244. Enter VERB 33 in G and N AGC DSKY. Press ENTER pushbutton. Wait at least 90 seconds.

245. Enter (and verify) VERB 41, NOUN 20

into G and N AGC DSKY. Press ENTER pushbutton. The G and N AGC DSKY shall flash and indicate 21-22.

246. Enter (and verify) VERB 33 into G and N AGC DSKY. Press ENTER pushbutton.

247. Enter (and verify) VERB 33 into G and N AGC DSKY. Press ENTER pushbutton. The COARS ALIGN mode lamp on the IMU CONTROL panel is the only mode lamp that is lighted.

248. Pressing of any of the mode pushbuttons on the IMU CONTROL panel shall not cause any of the mode lamps to light or go out.

249. Tilt the G and N Mounting Fixture to the 32.5 ± 0.5 degree position.

250. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 73}}{\text{Magnitude of step 69}}$$

Record on data sheet.

251. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 109}}{\text{Magnitude of step 105}}$$

Record on data sheet.

252. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 145}}{\text{Magnitude of step 143}}$$

Record on data sheet.

253. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 189}}{\text{Magnitude of step 186}}$$

Record on data sheet.

254. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 220}}{\text{Magnitude of step 217}}$$

Record on data sheet.

255. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 105}}{\text{Magnitude of step 69}}$$

Record on data sheet.

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 6

NO. 10084 JDC
REV. D
INITIAL TDRR 21539

JOB AGC MODE CONTROL TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
9	OUTER GIMBAL CDU	deg	-0.006				+0.006		
9	MIDDLE GIMBAL CDU	deg	-0.006				+0.006		
9	INNER GIMBAL CDU	deg	-0.006				+0.006		
16	IG time	sec	0				5.0		
20	MG time	sec	0				5.0		
25	OG time	sec	0				5.0		
28	IG IMU CDU DIFF	deg	-1.0				+1.0		
28	MG IMU CDU DIFF	deg	-1.0				+1.0		
28	OG IMU CDU DIFF	deg	-1.0				+1.0		
29a	IG CDU 1X error	mv rms	0				150		
29b	MG CDU 1X error	mv rms	0				150		
29c	OG CDU 1X error	mv rms	0				150		
29d	IGA 1X-sine	volts rms	20.25				24.75		
29e	IGA 1X cosine	volts rms	11.7				14.3		

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 6

JDC
NO. 10084
REV. D

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
29f	MGA 1X sine	volts rms	20.25				24.75		
29g	MGA 1X cosine	volts rms	11.7				14.3		
29h	OGA 1X sine	volts rms	20.25				24.75		
29i	OGA 1X cosine	volts rms	11.7				14.3		
30a	MGA 1X sine	deg	+1.0				+11.0		
30b	MGA 1X sine	deg	+1.0				+11.0		
30c	OGA 1X sine	deg	+1.0				+11.0		
30d	IGA 1X cosine	deg	+1.0				+11.0		
30e	MGA 1X cosine	deg	+1.0				+11.0		
30f	OGA 1X cosine	deg	+1.0				+11.0		
36a	IG CDU 16X error **	mv rms	-24.0				+24.0		
36b	MG CDU 16X error **	mv rms	-24.0				+24.0		
36c	OG CDU 16X error **	mv rms	-24.0				+24.0		
57	Yaw error ψ_{NB} Phase Shift	deg	-5.5				+5.5		
59	Yaw error ψ_{NB} Quad**	mv rms	-124				+124		
60	Yaw error ψ_{NB} Total**	mv rms	0				125		

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using 'MULT BY' factor to obtain the true value.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 6

JDC
NO. 10084
REV. D

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
69	Yaw body offset error ψ_{NB} (S/C)	volts rms	1.42				1.58		
93	Yaw error ψ_{SC} Phase Angle	deg	-5.5				+5.5		
95	Yaw error ψ_{SC} Quad. **	mv rms	-124				+124		
96	Yaw error ψ_{SC} Total**	mv rms	0				125		
105	Yaw body error ψ_{SC} (S/C)	volts rms	1.19				1.33		
147	Roll error ϕ_{NB} Phase Shift	deg	-5.5				+5.5		
149	Roll error ϕ_{NB} Quad. **	mv rms	-124				+124		
150	Roll error ϕ_{NB} Total**	mv rms	0				125		
151	Roll body offset error ϕ_{NB}(S/C)**	volts rms	+1.35				+1.65		
152	OGA 16X error	volts	-2.05				-2.51		
176	Roll error ϕ_{SC} Phase angle	deg	-5.5				+5.5		
178	Roll error ϕ_{SC} Quad. **	mv rms	-124				+124		
179	Roll error ϕ_{SC} Total**	mv rms	0				125		
186	Roll body error ϕ_{SC} (S/C)	volts	1.19				1.33		
206	Pitch error θ Phase Angle	deg	-8.9				+2.3		

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using 'MULT BY' factor to obtain the true value.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 **OF** 6

JDC NO. 10084
REV. D

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
208	Pitch error θ Quad.**	mv rms	-124				+124		
209	Pitch error θ Total**	mv rms	0				125		
217	Pitch body & off-set Error θ (S/C)	volts rms	1.42				1.58		
238	IG IMU CDU DIFF	deg	-4.0				-5.0		
239	MG IMU CDU DIFF	deg	-4.0				-5.0		
240	OG IMU CDU DIFF	deg	-4.0				-5.0		
250	Yaw body offset Error ratio		0.9				1.1		
251	Yaw body Error ratio		0.9				1.1		
252	Roll body offset Error ratio		0.9				1.1		
253	Roll body error ratio		0.9				1.1		
254	Pitch error ratio		0.9				1.1		
255	Yaw body to yaw offset error ratio		0.797				0.881		
	G&N AGC DSKY displays			DSKY displays were in accordance with those specified throughout the JDC.					
	G&N lamp displays			Lamp displays were in accordance with those specified throughout the JDC.					

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using 'MULT BY' factor to obtain the true value.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 6

JDC NO. 10084
REV. D

JOB AGC MODE CONTROL TEST

CALCULATION				
JDC ITEM NUMBER	PARAMETER	SIGN	VALUE	UNITS
73	Yaw body offset error ψ_{NB} (5°) (PSA)	+		volts rms
109	Yaw body error ψ_{SC} (5°) (PSA)	+		volts rms
133	OG CDU			degrees
134	OG CDU			degrees
138				volts rms
139				volts rms
143				volts rms
144				volts rms
145	Roll body offset error ϕ_{NB} (5°) (PSA)	+		volts rms
151	(Step 143 above) - (sign and magnitude of step 138 above)			volts rms
152	(Step 144 above) - (Sign and magnitude of step 139 above)			volts rms
189	Roll body error ϕ_{SC} (5°) (PSA)	+		volts rms
220	Pitch error θ (5°) (PSA)	+		volts rms
250	(Step 73 above) ÷ (Step 69)	+		
251	(Step 109 above) ÷ (Step 105)	+		
252	(Step 145 above) ÷ (Step 143)	+		

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 6

JDC NO. 10084
REV. D

JOB AGC MODE CONTROL TEST

CALCULATION				
JDC ITEM NUMBER	PARAMETER	SIGN	VALUE	UNITS
253	(Step 189 above) ÷ (Step 186)	+		
254	(Step 220 above) ÷ (Step 217)	+		
255	(Step 105) ÷ (Step 69)	+		

DATE 12 AUG 65

JOB AGC MODE CONTROL TEST | **JDC** 10084 **REV.** E **PAGE** 1 **OF** 17
INITIAL TDRR 21539 **D.S. PGS** 6

SUBSYSTEM G AND N SYSTEM | **ASSY.**

DESCRIPTION The G and N System is sequenced through its operating modes using the computer to initialize each mode. Visual displays of the modes are verified on IMU CONTROL panel and AGC display of mode register 3 as well as spacecraft, PSA front panel and telemetry interface.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-21-65	22662	12, 16	-	WK	ACM
B	11-3-65	23738	All	All	WK	ACM
C	11-23-65	24261	5	-	WK	-
D	5-6-66	28585	1, 9, 13	2, 3, 4	MM	ACM
E	7-5-66	30040	2	-	MM	-

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.3.1, 3-3.4.3.3, 3-3.8.2.1, 3-3.11.1.6 through 3-3.11.1.10, 3-3.11.2.62, 3-3.11.3.66, 3-3.11.2.67, 3-3.11.2.121 and 3-3.11.3.43 through 3-3.11.3.51, 3-3.11.2.82 through 3-3.11.2.84, 3-3.11.2.87 through 3-3.11.2.91, and 3-3.11.3.68 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. Those signals listed on the Data Sheet which are starred (**) must be corrected by the multiplication factor to obtain the true value.

1. Tilt G & N Mounting Fixture 32.5 ± 0.5 degrees.

2. Insure that TRANSFER switch on IMU CONTROL panel is set to COMPUTER.

3. Insure that TRACKER POWER switch on G & N indicator control panel is set to OFF and optics mode selector is set to MANUAL.

4. Set following switches on PRIMARY SIGNAL SELECTOR panel:

COUNTER INPUT "D" PULSE to 13
D SIGNAL/D PULSE pushbutton - "D" PULSE lighted

5. Set switches and controls on COUNTER as follows:

SAMPLE TIME (N_1) to 002048

VERIFICATION WITH SIDL REQUIRED BEFORE USE

CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to RATIO OR PERIOD
INPUT SELECTOR to C SENSE
SENSE SELECTOR to FWD
ATTN D to 10AC
SLOPE to +
TRIGGER VOLTAGE as required

NOTE: Read and understand steps 6 through 10 before proceeding. Perform steps 7 through 10 within 40 seconds after initiating step 6.

6a. Enter (and verify) VERB 41, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton; the VERB-NOUN display shall flash and indicate 21-22. Enter (and verify) +17900 into the G and N AGC DSKY. Press ENTER pushbutton. Enter (and verify) +17900 into the G and N AGC DSKY. Press ENTER pushbutton. Enter (and verify) +05500. Press ENTER pushbutton. After the third entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

6b. Enter (and verify) VERB 40, NOUN 20 (ZERO ENC mode) into G and N AGC DSKY. Press ENTER pushbutton. (The ZERO ENC, FINE ALIGN, ATT CONT and FINE ALIGN mode lamps on IMU CONTROL panel shall light in sequence stated above.) The ZERO ENCODER condition lamp shall remain lighted for approximately 20 seconds after the system enters the final FINE ALIGN mode of the sequence indicated above.

7. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

8. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate the contents of mode register 3 in row 1 as 50051.

9. The OUTER GIMBAL, MIDDLE GIMBAL and INNER GIMBAL CDU's shall indicate 0.000 (±0.006°). Record.

10. Enter (and verify) VERB 15, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display shall indicate the contents of X, Y and Z CDU counters in rows 1, 2 and 3 as all zeros prior to entering the first FINE ALIGN mode of the sequence stated in step 6.

NOTE: If rows 1, 2 and 3 do not each indicate 00000, repeat steps 6 and 10 once after the ZERO ENCODER light goes out. If they again do not indicate 00000, the system has failed the test.

11. Enter (and verify) VERB 41, NOUN 20 into G & N AGC DSKY. Press ENTER pushbutton; the VERB-NOUN display shall flash and indicate 21-22.

12. Enter +00000 into G and N AGC DSKY three times pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing after pressing ENTER pushbutton the third time and the COARS ALGIN lamp on the IMU CONTROL panel shall light and the FINE ALIGN lamp shall go out.

13. Monitor IG + Δθ pulses at 45A5J1, pins 23 (high) and 1 (low) using pulse probes on PSA Adapter.

14. Enter (and verify) VERB 25, NOUN 22 into the G and N AGC DSKY. Press ENTER pushbutton. VERB-NOUN display shall flash and indicate 21-22.

15. Enter +06000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

16. Enter +06000 into G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record second printout of the DIGITAL RECORDER.

NOTE: The GIMBAL LOCK lamps on the Condition Annunciator and MONITOR panel may light. Disregard these lamp indications unless specifically indicated to do otherwise.

17. Monitor MG -Δθ pulses at 45A5J1 pins 32 (high) and 1 (low) using pulse probes on PSA Adapter.

18. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

19. Enter +00000 into G and N AGC DSKY twice pressing the ENTER pushbutton after each entry.

20. Enter +00000 into the G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record the second printout of the DIGITAL RECORDER.

21. Monitor OG + Δθ pulses at 45A5J1, pins 25 (high) and 1 (low) using pulse probes on PSA Adapter.

22. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

23. Enter +06000 into G and N AGC DSKY. Press ENTER pushbutton.

24. Enter +06000 into G and N AGC DSKY. Press the ENTER pushbutton.

25. Enter +06000 into the G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record the second printout of the DIGITAL RECORDER.

26. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

27. Enter address 00007_8 into G& N AGC DSKY. Press ENTER pushbutton. AGC DSKY shall indicate the contents of mode register 3 in row 1 as 50042.

28. Record the IMU-CDU DIFFERENCE meter indications.

29. Measure in phase voltage of the following signals on the PAVM using CROSSBAR CONTROL setting indicated for each signal (CROSSBAR CONTROL is located on PRIMARY SIGNAL SELECTOR):

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IG CDU 1X error	232	56P9 pins 59 (high) and 41 (low)
b. MG CDU 1X error	231	56P9 pins 60 (high) and 43 (low)
c. OG CDU 1X error	230	56P9 pins 77 (high) and 61 (low)
d. IGA 1X sine	144	56P9 pins 1 (S2) and 23 (S4)
e. IGA 1X cosine	243	56P9 pins 2(S1) and 3 (S3)
f. MGA 1X sine	143	56P9 pins 24 (S2) and 42 (S4)
g. MGA 1X cosine	242	56P9 pins 25 (S1) and 44 (S3)
h. OGA 1X sine	142	56P9 pins 4 (S2) and 26 (S4)
i. OGA 1X cosine	241	56P9 pins 45 (S1) and 27 (S3)

30. Measure the phase angle of the following signals with respect to 800~ demod. reference on the PAVM by using the CROSSBAR CONTROL setting indicated for each signal:

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IGA 1X sine	144	56P9 pins 1 (S2) and 23 (S4)
b. MGA 1X sine	143	56P9 pins 24 (S2) and 42 (S4)
c. OGA 1X sine	142	56P9 pins 4 (S2) and 26 (S4)
d. IGA 1X cosine	243	56P9 pins 2 (S1) and 3 (S3)
e. MGA 1X cosine	242	56P9 pins 25 (S1) and 44 (S3)
f. OGA 1X cosine	241	56P9 pins 45 (S1) and 27 (S3)

Record indications.

31. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY.

32. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

33. Enter +00000 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing.

34. Enter (and verify) VERB 42 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

35. Enter (and verify) 00000 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing and indicate 42-67. The FINE ALIGN mode lamp on the IMU CONTROL panel shall be the only lamp that lights.

36. Monitor in-phase voltage of the following signals on the PAVM using CROSSBAR CONTROL setting indicated for each signal:

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IG CDU 16X error	229	45A6J1 pins 20 (high) and 21 (low)
b. MG CDU 16X error	228	45A6J1 pins 27 (high) and 28 (low)
c. OG CDU 16X error	227	45A6J1 pins 35 (high) and 36 (low)

Record indications.

37. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

38. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate the contents of mode register 3 in row 1 as 50050.

39. Insure that the SCS LOADS ENTRY pushbutton on the TEST CONTROL panel is lighted.

40. Set CROSSBAR CONTROL to 99 and VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

41. Calibrate the PAVM with FREQUENCY control set to 800 ~ #2. Set controls as follows:

FUNCTION to 0°
DEGREES to 0°

42. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton (the ZERO ENC, FINE ALIGN, ATT CONT and FINE ALIGN mode lamps on the IMU CONTROL panel shall light in the sequence stated above). The ZERO ENCODER condition lamp shall remain lighted for

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approximately 20 seconds after the system enters the final FINE ALIGN mode of the sequence indicated above.

43. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

44. Enter (and verify) +00000 into the G and N DSKY. Press ENTER pushbutton.

45. Repeat step 44 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding to step 46.

46. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

47. Enter +00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

48. Enter (and verify) VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

49. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° + 1.0000° into the G and N AGC DSKY. Press ENTER pushbutton.

50. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

51. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

52. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

53. Monitor Pitch error (θ) on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

54. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

55. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

56. Observe the PAVM and adjust MG CDU thumbwheel until PAVM indicates approximately +1.5 volts. Insure that increasing angle on CDU results in positive voltage indication.

57. Measure the Yaw body offset error phase angle on PAVM. Record indication (and sign).

58. Observe the PAVM and obtain best possible in-phase null using MG CDU thumbwheel.

59. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

60. Set FUNCTION switch on the PAVM to TOTAL. Measure and

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record the PAVM indication.

61. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain -10 mv on 30 mv scale using MG CDU. Note the time interval for the error signal to drift from null to +15 mv.

NOTE: Read and understand steps 62 through 73 before proceeding. These steps must be accomplished as quickly as possible without interruption.

62. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

63. Enter +00000 into the G and N AGC DSKY. Press ENTER pushbutton.

64. Enter +00000 into the G and N AGC DSKY. Press ENTER pushbutton.

65. Enter +50000 into the G and N AGC DSKY. DO NOT press ENTER pushbutton.

66. Observe the PAVM and obtain -20 mv signal on 30 mv scale using MG CDU. When the PAVM passes through -15 mv, start timing the interval obtained in step 61.

67. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Set DVM FUNCTION switch to AC. Press ENTER pushbutton on G and N AGC DSKY.

68. Using dc probes monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low).

69. At the end of the time interval started in step 66, record the DVM indication on the data sheet.

70. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

71. Set DVM to OFF.

72. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

73. Monitor Yaw body offset error ψ_{NB} at 45A7J1, pins 35 (high) and 36 (low) with ac probes on PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

74. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

75. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

76. Enter (and verify) +00000 into the G and N AGC DSKY. Press ENTER pushbutton.

77. Repeat step 76 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

78. Enter (and verify) VERB 42 into the G

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and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

79. Enter +00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

80. Enter (and verify) VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

81. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° + 1.0000° into the G and N AGC DSKY. Press ENTER pushbutton.

82. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

83. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

84. Enter (and verify) VERB 43 into G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

85. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

86. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

87. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

88. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

89. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. SCS LOADS NORMAL shall light.

90. Monitor Yaw body error ψ_{SC} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

91. Observe the PAVM and obtain best possible null using OG CDU thumbwheel.

92. Observe the PAVM and adjust the MG CDU thumbwheel until PAVM indicates approximately +1.25 volts. Insure that increasing angle on CDU results in positive voltage indication.

93. Measure the Yaw body error phase angle on PAVM. Record indication and sign.

94. Observe the PAVM and obtain best possible in-phase null using MG CDU thumbwheel.

95. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

96. Set FUNCTION switch on PAVM to TOTAL. Measure and record the PAVM indication.

97. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain -10 mv on 30 mv scale using MG CDU. Note the time interval for the error signal to

drift from null to + 25 mv.

NOTE: Read and understand steps 98 through 109 before proceeding. These steps must be accomplished as quickly as possible without interruption.

98. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

99. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

100. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

101. Enter + 50000 into G and N AGC DSKY. DO NOT press ENTER pushbutton

102. Observe the PAVM and obtain -30 mv signal on 30 mv scale using MG CDU. When the PAVM passes through -25 mv, start timing the time interval obtained in step 97.

103. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC. Press ENTER pushbutton on G and N AGC DSKY.

104. Using dc probes monitor Yaw body error ψ_{SC} on PSA Adapter Tray 9, pins 34 (high) and 38 (low).

105. At the end of the time interval started in step 104, record the DVM indication on the data sheet.

106. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

107. Set DVM to OFF.

108. Set controls on PAVM as follows:

FUNCTION to 0°

DEGREES to 0°

109. Monitor Yaw body error ψ_{SC} at 45A7J1, pins 7 (high) and 8 (low) with ac probes on PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

110. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

111. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

112. Depending upon the test site location, enter (and verify) the appropriate angle into the G and N AGC DSKY. (See chart below). Press ENTER pushbutton.

SITE LOCATION	Angle
ACSP	+ 07540
NAA	+ 06643
MILA	+ 06101
MIT	+ 07487
MSC	+ 06206

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113. Enter (and verify) +00000 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 60 seconds before proceeding.

114. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

115. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

116. Repeat step 115 twice.

CAUTION: During the following step, exercise adequate care to prevent damaging strain to connecting cables.

117. Observe the IG CDU indicator and carefully tilt the G and N Mounting Fixture until the IG CDU indicator reads 000.00°. Insure that at least 90 seconds have elapsed since performing step 116 before proceeding.

118. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

119. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

120. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

121. Repeat step 120 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

122. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

123. Enter +00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry.

124. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS ENTRY pushbutton shall light.

125. Using ac probes monitor Roll body offset error ϕ_{NB} on PSA Adapter Tray 9, pins 35 (high) and 38 (low).

126. After at least 90 seconds have elapsed since performing step 123, enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

127. Observe the OG CDU indications as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

128. Enter +00000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry. Enter (and verify) VERB 21, NOUN 01 into G and N AGC DSKY. Press ENTER pushbutton. Enter (and verify) 00713 and press ENTER pushbutton. Enter (and verify) 37777 and press ENTER pushbutton.

129. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

130. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

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131. Enter (and verify) +00000 into the G and N AGC DSKY. Press ENTER pushbutton.

132. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton. The ENTRY Mode lamp on the IMU CONTROL panel shall be the only mode lamp that lights.

133. Using OG CDU thumbwheel, adjust OG CDU until a null is obtained on the .01 volt scale of PAVM. Record OG CDU indication on calculation sheet.

134. Release thumbwheel of OG CDU and record OG CDU indication on calculation sheet.

135. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton.

136. Algebraically subtract indication of step 134 from indication of step 133 and enter (and verify) the result into the G and N AGC DSKY as ±XXX.XX degrees. Press ENTER pushbutton.

137. Enter (and verify) +00000 into G and N AGC DSKY twice. Press ENTER pushbutton after each entry.

NOTE: PAVM indication will oscillate. Determine peak to peak excursion and choose midpoint of excursion when making measurements in steps 138 and 144.

138. Observe PAVM indication on .1 volt scale. If indication remains on scale, record value and sign of midpoint of excursions on calculation sheet. If INDICATION DOES NOT remain fully on scale, repeat steps 136 through 138 adjusting the DSKY ENTRY of step 136 slightly until indication does stay on scale, and then record midpoint.

NOTE: Changing DSKY entry by ±000.01 will change reading by 0.048 volts.

139. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 235 to measure OGA 16X error at 56P9 pins 27 (high) and 26 (low) on the PAVM. Record midpoint of excursion on calculation sheet. (The PAVM voltage scale setting may be changed if necessary.) Return CROSSBAR CONTROL to 199.

140. Algebraically add +00031 to indication in row 1 of AGC DSKY.

141. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton. Enter result of addition in step 140 into G and N AGC DSKY as ±XXXXX. Press ENTER pushbutton.

142. Enter +00000 into G and N AGC DSKY twice, pressing the ENTER pushbutton after each entry. Wait 20 seconds before proceeding.

143. Record the indication and sign on 3 volt scale of PAVM on calculation sheet.

144. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 235 and record PAVM indication and sign on calculation sheet. Return CROSSBAR CONTROL to 199.

145. Monitor Roll body offset error ϕ_{NB} at 45A7J1, pins 27 (high) and 28 (low) using ac probes on the PSA Adapter. Record PAVM indication on calculation sheet and verify that indication is positive.

146. Monitor Roll body offset error ϕ_{NB} on PSA Adapter Tray 9, pins 35 (high) and 38 (low) using ac probes. Verify that PAVM indication is positive.

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147. Measure Roll body offset error phase angle on PAVM. Record indication and sign.

148. Use the OUTER GIMBAL CDU thumbwheel to obtain a fine null on the 0.003 scale of PAVM. Drift may be observed on PAVM. Obtain best possible null and then hold thumbwheel in subsequent steps 149 and 150.

149. Set FUNCTION switch on PAVM to 90°. Measure and record the PAVM indication (and sign).

150. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication. Release the thumbwheel.

151. Algebraically subtract indication recorded in step 138 from that recorded in step 143 on calculation sheet. Record result on data sheet.

152. Algebraically subtract indication recorded in step 139 from that recorded in step 144 on calculation sheet. Record result on data sheet.

153. Enter VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

154. Enter address 00007_8 into G and N AGC DSKY. AGC display shall indicate contents of mode register 3 in row 1 as 50140.

155. Set controls on PAVM as follows:

FUNCTION to 0°

DEGREES to 0°

156. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

157. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

158. Enter (and verify) -03250 into the G and N AGC DSKY. Press ENTER pushbutton.

159. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 60 seconds.

160. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

161. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

162. Repeat step 161 twice.

CAUTION: During the following step, exercise adequate care to prevent damaging strain to connecting cables.

163. Observe the IG CDU indicator and carefully tilt the G and N Mounting Fixture until the IG CDU indicator reads 000.00°.

164. After at least 90 seconds has elapsed since performing step 162 enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

165. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

166. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

167. Observe the MG CDU indication as

±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

168. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

169. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

170. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

171. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

172. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

173. Monitor Roll body error ϕ_{SC} on PSA Adapter Tray 9, pins 35 (high) and 38 (low) with ac probes.

174. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS NORMAL pushbutton shall light.

175. Observe the PAVM and adjust OG CDU thumbwheel until PAVM indicates approximately + 1.25 volts. Insure that increasing angle on CDU results in positive voltage indication.

176. Measure the Roll body error phase angle on PAVM and let PAVM degrees dial remain at this indication. Record indication (and sign).

177. Observe the PAVM and obtain best possible in-phase null using OG CDU thumbwheel.

178. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

179. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication.

NOTE: Perform steps 180
thru 189 as quickly as
possible.

180. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain best possible null on 10 mv scale using OG CDU.

181. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC.

182. Using dc probes monitor Roll body error ϕ_{SC} on PSA Adapter Tray 9, pins 35 (high) and 38 (low).

183. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

184. Enter +50000 into the G and N AGC DSKY. Press ENTER pushbutton.

185. Enter +00000 into the G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

186. Record the DVM indication

on the data sheet.

187. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR. Set DVM to OFF.

188. Set controls on PAVM as follows:
FUNCTION to 0°
DEGREES to 0°

189. Monitor Roll body error ϕ_{SC} at 45A7J1, pins 14 (high) and 15 (low) using ac probes on PSA Adapter. Verify that PAVM indication is positive and record value on calculation sheet.

190. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

191. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

192. Enter (and verify) +00000 into the G and N AGC DSKY. Press ENTER pushbutton.

193. Repeat step 192 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

194. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

195. Enter +00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

196. Enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

197. Observe the OG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

198. Observe the IG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

199. Observe the MG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

200. Enter (and verify) VERB 43 into G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

201. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS ENTRY pushbutton shall light.

202. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

203. Observe the PAVM and obtain best possible null on 30 mv scale using MG CDU thumbwheel.

204. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

205. Observe the PAVM and adjust the IG CDU thumbwheel until PAVM indicates approximately + 1.5 volts. Insure that increasing angle on CDU results in positive voltage indication.

206. Measure the Pitch error phase angle on the PAVM and let PAVM degrees dial remain at this indication. Record indication (and sign).

207. Observe the PAVM and obtain best possible in-phase null using IG CDU thumbwheel.

208. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

209. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication.

NOTE: Perform steps 210
thru 220 as quickly as
possible.

210. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain best possible null on 10 mv scale using IG CDU.

211. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC.

212. Using dc probes monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low).

213. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

214. Enter +00000 into the G and N AGC DSKY. Press ENTER pushbutton.

215. Enter +50000 into the G and N AGC DSKY. Press ENTER pushbutton.

216. Enter +00000 into the G and N AGC DSKY. Press ENTER pushbutton.

217. Record the DVM indication on the data sheet.

218. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR. Set DVM to OFF.

219. Set controls on PAVM as follows:
FUNCTION to 0°
DEGREES to 0°

220. Monitor Pitch error θ at 45A7J1, pins 20 (high) and 21 (low) with ac probes on the PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

221. Enter (and verify) VERB 41, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

222. Enter +09000 into G and N AGC DSKY. Press ENTER pushbutton.

223. Enter +00000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry. Wait at least 60 seconds before proceeding.

224. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton.

225. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) using ac probes.

226. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

227. Enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

228. Enter +00000 into G and N AGC DSKY. Press ENTER pushbutton.

229. Enter +00000 into G and N AGC DSKY. Press ENTER pushbutton.

230. Enter +50000 into G and N AGC DSKY. Press ENTER pushbutton.

231. Verify that the PAVM indication is positive (approximately + 1.5 volts).

232. Enter (and verify) VERB 41. NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

233. Enter +00000 into G and N AGC DSKY three times pressing ENTER pushbutton after each entry. Wait at least 60 seconds before proceeding.

234. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

235. Enter +00000 into G and N AGC DSKY three times pressing the ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding. Repeat steps 196 thru 199.

236. Enter (and verify) VERB 44 (ATTITUDE CONTROL mode) into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-23.

237. Enter +00500 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The ATT CONT lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

238. Record INNER IMU CDU DIFFERENCE meter indication.

239. Record MIDDLE IMU CDU DIFFERENCE meter indication.

240. Record OUTER IMU CDU DIFFERENCE meter indication.

241. Enter (and verify) VERB 11, NOUN 01 into the G and N AGC DSKY. Press ENTER pushbutton.

242. Enter 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate contents of mode register 3 in row 1 as 50060.

243. Enter VERB 42, NOUN 67 into G and N AGC DSKY. Press ENTER pushbutton.

244. Enter VERB 33 in G and N AGC DSKY. Press ENTER pushbutton. Wait at least 90 seconds.

245. Enter (and verify) VERB 41, NOUN 20

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into G and N AGC DSKY. Press ENTER pushbutton. The G and N AGC DSKY shall flash and indicate 21-22.

246. Enter (and verify) VERB 33 into G and N AGC DSKY. Press ENTER pushbutton.

247. Enter (and verify) VERB 33 into G and N AGC DSKY. Press ENTER pushbutton. The COARS ALIGN mode lamp on the IMU CONTROL panel is the only mode lamp that is lighted.

248. Pressing of any of the mode pushbuttons on the IMU CONTROL panel shall not cause any of the mode lamps to light or go out.

249. Tilt the G and N Mounting Fixture to the 32.5 ± 0.5 degree position.

250. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 73}}{\text{Magnitude of step 69}}$$

Record on data sheet.

251. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 109}}{\text{Magnitude of step 105}}$$

Record on data sheet.

252. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 145}}{\text{Magnitude of step 143}}$$

Record on data sheet.

253. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 189}}{\text{Magnitude of step 186}}$$

Record on data sheet.

254. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 220}}{\text{Magnitude of step 217}}$$

Record on data sheet.

255. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 105}}{\text{Magnitude of step 69}}$$

Record on data sheet.

DATE 12 AUG 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 6

JDC
NO. 10084
REV. E
INITIAL TDRR 21539

JOB AGC MODE CONTROL TEST

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
9	OUTER GIMBAL CDU	deg	-0.006				+0.006		
9	MIDDLE GIMBAL CDU	deg	-0.006				+0.006		
9	INNER GIMBAL CDU	deg	-0.006				+0.006		
16	IG time	sec	0				5.0		
20	MG time	sec	0				5.0		
25	OG time	sec	0				5.0		
28	IG IMU CDU DIFF	deg	-1.0				+1.0		
28	MG IMU CDU DIFF	deg	-1.0				+1.0		
28	OG IMU CDU DIFF	deg	-1.0				+1.0		
29a	IG CDU 1X error	mv rms	0				150		
29b	MG CDU 1X error	mv rms	0				150		
29c	OG CDU 1X error	mv rms	0				150		
29d	IGA 1X-sine	volts rms	20.25				24.75		
29e	IGA 1X cosine	volts rms	11.7				14.3		

* TO BE USED AS REQUIRED OR DESIRED

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 6

JDC
NO. 10084
REV E

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
29f	MGA 1X sine	volts rms	20.25				24.75		
29g	MGA 1X cosine	volts rms	11.7				14.3		
29h	OGA 1X sine	volts rms	20.25				24.75		
29i	OGA 1X cosine	volts rms	11.7				14.3		
30a	MGA 1X sine	deg	+1.0				+11.0		
30b	MGA 1X sine	deg	+1.0				+11.0		
30c	OGA 1X sine	deg	+1.0				+11.0		
30d	IGA 1X cosine	deg	+1.0				+11.0		
30e	MGA 1X cosine	deg	+1.0				+11.0		
30f	OGA 1X cosine	deg	+1.0				+11.0		
36a	IG CDU 16X error **	mv rms	-24.0				+24.0		
36b	MG CDU 16X error **	mv rms	-24.0				+24.0		
36c	OG CDU 16X error **	mv rms	-24.0				+24.0		
57	Yaw error ψ_{NB} Phase Shift	deg	-5.5				+5.5		
59	Yaw error ψ_{NB} Quad**	mv rms	-124				+124		
60	Yaw error ψ_{NB} Total**	mv rms	0				125		

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using 'MULT BY' factor to obtain the true value.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 **OF** 6

JDC
NO. 10084
REV E

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
69	Yaw body offset error ψ_{NB} (S/C)	volts rms	1.42				1.58		
93	Yaw error ψ_{SC} Phase Angle	deg	-5.5				+5.5		
95	Yaw error ψ_{SC} Quad.**	mv rms	-124				+124		
96	Yaw error ψ_{SC} Total**	mv rms	0				125		
105	Yaw body error ψ_{SC} (S/C)	volts rms	1.19				1.33		
147	Roll error ϕ_{NB} Phase Shift	deg	-5.5				+5.5		
149	Roll error ϕ_{NB} Quad.**	mv rms	-124				+124		
150	Roll error ϕ_{NB} Total**	mv rms	0				125		
151	Roll body offset error ϕ_{NB}(S/C)**	volts rms	+1.35				+1.65		
152	OGA 16X error	volts	-2.05				-2.51		
176	Roll error ϕ_{SC} Phase angle	deg	-5.5				+5.5		
178	Roll error ϕ_{SC} Quad.**	mv rms	-124				+124		
179	Roll error ϕ_{SC} Total**	mv rms	0				125		
186	Roll body error ϕ_{SC} (S/C)	volts	1.19				1.33		
206	Pitch error θ Phase Angle	deg	-8.9				+2.3		

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using 'MULT BY' factor to obtain the true value.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 6

JDC
NO. 10084
REV. E

JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
208	Pitch error θ Quad.**	mv rms	-124				+124		
209	Pitch error θ Total**	mv rms	0				125		
217	Pitch body & off-set Error θ (S/C)	volts rms	1.42				1.58		
238	IG IMU CDU DIFF	deg	-4.0				-5.0		
239	MG IMU CDU DIFF	deg	-4.0				-5.0		
240	OG IMU CDU DIFF	deg	-4.0				-5.0		
250	Yaw body offset Error ratio		0.9				1.1		
251	Yaw body Error ratio		0.9				1.1		
252	Roll body offset Error ratio		0.9				1.1		
253	Roll body error ratio		0.9				1.1		
254	Pitch error ratio		0.9				1.1		
255	Yaw body to yaw offset error ratio		0.797				0.881		
	G&N AGC DSKY displays			DSKY displays were in accordance with those specified throughout the JDC.					
	G&N lamp displays			Lamp displays were in accordance with those specified throughout the JDC.					

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using 'MULT BY' factor to obtain the true value.

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 6

JDC
NO. 10084
REV. E

JOB AGC MODE CONTROL TEST

CALCULATION				
JDC ITEM NUMBER	PARAMETER	SIGN	VALUE	UNITS
73	Yaw body offset error ψ_{NB} (5°) (PSA)	+		volts rms
109	Yaw body error ψ_{SC} (5°) (PSA)	+		volts rms
133	OG CDU			degrees
134	OG CDU			degrees
138				volts rms
139				volts rms
143				volts rms
144				volts rms
145	Roll body offset error ϕ_{NB} (5°) (PSA)	+		volts rms
151	(Step 143 above) - (sign and magnitude of step 138 above)			volts rms
152	(Step 144 above) - (Sign and magnitude of step 139 above)			volts rms
189	Roll body error ϕ_{SC} (5°) (PSA)	+		volts rms
220	Pitch error θ (5°) (PSA)	+		volts rms
250	(Step 73 above) ÷ (Step 69)	+		
251	(Step 109 above) ÷ (Step 105)	+		
252	(Step 145 above) ÷ (Step 143)	+		

REMARKS:

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 6

JDC
NO. 10084
REV. E

JOB AGC MODE CONTROL TEST

CALCULATION				
JDC ITEM NUMBER	PARAMETER	SIGN	VALUE	UNITS
253	(Step 189 above) ÷ (Step 186)	+		
254	(Step 220 above) ÷ (Step 217)	+		
255	(Step 105) ÷ (Step 69)	+		

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TDRR 21539 AUG 12 1965

JOB AGC MODE CONTROL TEST | JDC 10084 REV. ____ PAGE 1 OF 17
INITIAL TDRR ________ D.S. PGS 6

SUBSYSTEM G AND N SYSTEM | ASSY.

DESCRIPTION The G and N System is sequenced through its operating modes using the computer to initialize each mode. Visual displays of the modes are verified on IMU CONTROL panel and AGC display of mode register 3 as well as spacecraft, PSA front panel and telemetry interface.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES See below.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

REFERENCES: Paragraphs 3-3.4.3.1, 3-3.4.3.3, 3-3.8 2.1, 3-3.11.1.6 through 3-3.11.1.10, 3-3.11.2.62, 3-3.11.3.66, 3-3.11.2.67, 3-3.11.2.121 and 3-3.11.3.43 through 3-3.11.51, 3-3.11.2.82 through 3-3.11.2.84, 3-3.11.2.87 through 3-3.11.2.91, and 3-3.11.3.68 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. Those signals listed on the Data Sheet which are starred (**) must be corrected by the multiplication factor found on the signal identification drawings 1902141-003 or 1902141-004 to obtain the true value.

1. Tilt G and N Mounting Fixture 32.5 ± 0.5 degrees.
2. Insure that TRANSFER switch on IMU CONTROL panel is set to COMPUTER.
3. Insure that TRACKER POWER switch on G and N indicator control panel is set to OFF and optics mode selector is set to MANUAL.
4. Set following switches on PRIMARY SIGNAL SELECTOR panel:
   COUNTER INPUT "D" PULSE to 13
   D SIGNAL/D PULSE pushbutton - "D" PULSE lighted
5. Set switches and controls on COUNTER as follows:
   SAMPLE TIME (N_1) to 002048

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to RATIO OR PERIOD
INPUT SELECTOR to C SENSE
SENSE SELECTOR to FWD
ATTN D to 10AC
SLOPE to +
TRIGGER VOLTAGE as required

NOTE: Read and understand steps 6 through 10 before proceeding. Perform steps 7 through 10 within 40 seconds after initiating step 6.

6. Enter (and verify) VERB 40, NOUN 20 (ZERO ENC mode) into G and N AGC DSKY. Press ENTER pushbutton. (The ZERO ENC, FINE ALIGN, ATT CONT and FINE ALIGN mode lamps on IMU CONTROL panel shall light in sequence stated above). The ZERO ENCODER condition lamp shall remain lighted for approximately 20 seconds after the system enters the final FINE ALIGN mode of the sequence indicated above.

7. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

8. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate the contents of mode register 3 in row 1 as 50051.

9. The OUTER GIMBAL, MIDDLE GIMBAL and INNER GIMBAL CDU's shall indicate 0.000 (±0.006°). Record.

10. Enter (and verify) VERB 15, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The AGC display shall indicate the contents of X, Y and Z CDU counters in rows 1, 2 and 3 as all zeros prior to entering the first FINE ALIGN mode of the sequence stated in step 6.

NOTE: If rows 1, 2 and 3 do not each indicate 00000, repeat steps 6 and 10 once after the ZERO ENCODER light goes out. If they again do not indicate 00000, the system has failed the test.

11. Enter (and verify) VERB 41, NOUN 20 into G&N AGC DSKY. Press ENTER pushbutton; the VERB-NOUN display shall flash and indicate 21-22.

12. Enter +00000 into G and N AGC DSKY three times pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing after pressing ENTER pushbutton the third time and the COARS ALIGN lamp on the IMU CONTROL panel shall light and the FINE ALIGN lamp shall go out.

13. Monitor IG + Δθ pulses at 45A5J1, pins 23 (high) and 1 (low) using pulse probes on PSA Adapter.

14. Enter (and verify) VERB 25, NOUN 22 into the G and N AGC DSKY. Press ENTER

DATE ______

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pushbutton. VERB-NOUN display shall flash and indicate 21-22.

15. Enter +06000 into G&N AGC DSKY twice pressing ENTER pushbutton after each entry.

16. Enter +06000 into G&N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record second printout of the DIGITAL RECORDER.

NOTE: The GIMBAL LOCK lamps on the Condition Annunciator and MONITOR panel may light. Disregard these lamp indications unless specifically indicated to do otherwise.

17. Monitor MG -Δθ pulses at 45A5J1 pins 32 (high) and 1 (low) using pulse probes on PSA Adapter.

18. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

19. Enter +00000 into G and N AGC DSKY twice pressing the ENTER pushbutton after each entry.

20. Enter +00000 into the G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record the second printout of the DIGITAL RECORDER.

21. Monitor OG + Δθ pulses at 45A5J1, pins 25 (high) and 1 (low) using pulse probes on PSA Adapter.

22. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY. Press ENTER pushbutton on G&N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

23. Enter +06000 into G and N AGC DSKY. Press the ENTER pushbutton.

24. Enter +06000 into G and N AGC DSKY. Press ENTER pushbutton.

25. Enter +06000 into the G and N AGC DSKY. Press RESET button on COUNTER and ENTER pushbutton on G and N AGC DSKY simultaneously. Record the second printout of the DIGITAL RECORDER.

26. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

27. Enter address 00007_8 into G&N AGC DSKY. Press ENTER pushbutton AGC DSKY shall indicate the contents of mode register 3 in row 1 as 50042.

28. Record the IMU-CDU DIFFERENCE meter indications.

29. Measure in phase voltage of the following signals on the PAVM using CROSSBAR CONTROL setting indicated for each signal: (CROSSBAR CONTROL is located on PRIMARY SIGNAL SELECTOR).

DATE ______

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IG CDU 1X error	232	56P9 pins 59 (high) and 41 (low)
b. MG CDU 1X error	231	56P9 pins 60 (high) and 43 (low)
c. OG CDU 1X error	230	56P9 pins 77 (high) and 61 (low)
d. IGA 1X sine	144	56P9 pins 1 (S2) and 23 (S4)
e. IGA 1X cosine	243	56P9 pins 2(S1) and 3 (S3)
f. MGA 1X sine	143	56P9 pins 24 (S2) and 42 (S4)
g. MGA 1X cosine	242	56P9 pins 25 (S1) and 44 (S3)
h. OGA 1X sine	142	56P9 pins 4 (S2) and 26 (S4)
i. OGA 1X cosine	241	56P9 pins 45 (S1) and 27 (S3)

30. Measure the phase angle of the following signals with respect to 800~ demod. reference on the PAVM by using the CROSSBAR CONTROL setting indicated for each signal.

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IGA 1X sine	144	56P9 pins 1 (S2) and 23 (S4)
b. MGA 1X sine	143	56P9 pins 24 (S2) and 42 (S4)
c. OGA 1X sine	142	56P9 pins 4 (S2) and 26 (S4)
d. IGA 1X cosine	243	56P9 pins 2 (S1) and 3 (S3)
e. MGA 1X cosine	242	56P9 pins 25 (S1) and 44 (S3)
f. OGA 1X cosine	241	56P9 pins 45 (S1) and 27 (S3)

Record indications.

DATE ______

31. Enter (and verify) VERB 25, NOUN 22 into G and N AGC DSKY.

32. Press ENTER pushbutton on G and N AGC DSKY. The VERB-NOUN display shall flash and indicate 21-22.

33. Enter + 00000 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The VERB-NOUN display shall stop flashing.

34. Enter (and verify) VERB 42 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

35. Enter (and verify) VERB 33. Press ENTER pushbutton. The VERB-NOUN display shall stop flashing and indicate 42-67. The FINE ALIGN mode lamp on the IMU CONTROL panel shall be the only lamp that lights.

36. Monitor in-phase voltage of the following signals on the PAVM using CROSSBAR CONTROL setting indicated for each signal:

SIGNAL	CROSSBAR CONTROL	SIGNAL LOCATION
a. IG CDU 16X error	229	45A6J1 pins 20 (high) and 21 (low)
b. MG CDU 16X error	228	45A6J1 pins 27 (high) and 28 (low)
c. OG CDU 16X error	227	45A6J1 pins 35 (high) and 36 (low)

Record indications.

37. Enter (and verify) VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

38. Enter address 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate the contents of mode register 3 in row 1 as 50050.

39. Insure that the SCS LOADS ENTRY pushbutton on the TEST CONTROL panel is lighted.

40. Set CROSSBAR CONTROL to 99 and VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

41. Calibrate the PAVM with FREQUENCY control set to 800 ~ #2. Set controls as follows:

FUNCTION to 0°
DEGREES to 0°

42. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton (the ZERO ENC, FINE ALIGN, ATT CONT and FINE ALIGN mode lamps on the IMU CONTROL panel shall light in the sequence stated above). The ZERO ENCODER condition lamp shall remain lighted for

approximately 20 seconds after the system enters the final FINE ALIGN mode of the sequence indicated above.

43. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

44. Enter (and verify) + 00000 into the G and N DSKY. Press ENTER pushbutton.

45. Repeat step 44 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding to step 46.

46. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

47. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

48. Enter (and verify) VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

49. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° + 1.0000° into the G and N AGC DSKY. Press ENTER pushbutton.

50. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

51. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

52. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

53. Monitor Pitch error (θ) on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

54. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

55. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

56. Observe the PAVM and adjust MG CDU thumbwheel until PAVM indicates approximately + 1.5 volts. Insure that increasing angle on CDU results in positive voltage indication.

57. Measure the Yaw body offset error phase angle on PAVM. Record indication (and sign).

58. Observe the PAVM and obtain best possible in-phase null using MG CDU thumbwheel.

59. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

60. Set FUNCTION switch on the PAVM to TOTAL. Measure and

record the PAVM indication.

61. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain -10 mv on 30 mv scale using MG CDU. Note the time interval for the error signal to drift from null to + 15 mv.

NOTE: Read and understand steps 62 through 73 before proceeding. These steps must be accomplished as quickly as possible without interruption.

62. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

63. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

64. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

65. Enter + 50000 into the G and N AGC DSKY. DO NOT press ENTER pushbutton.

66. Observe the PAVM and obtain -20 mv signal on 30 mv scale using MG CDU. When the PAVM passes through -15 mv, start timing the interval obtained in step 61.

67. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Set DVM FUNCTION switch to AC. Press ENTER pushbutton on G and N AGC DSKY.

68. Using dc probes monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low).

69. At the end of the time interval started in step 66, record the DVM indication on the data sheet.

70. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

71. Set DVM to OFF.

72. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

73. Monitor Yaw body offset error ψ_{NB} at 45A7J1, pins 35 (high) and 36 (low) with ac probes on PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

74. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

75. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

76. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

77. Repeat step 76 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

78. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

79. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

80. Enter (and verify) VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

81. Observe the OG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° + 1.0000° into the G and N AGC DSKY. Press ENTER pushbutton.

82. Observe the IG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

83. Observe the MG CDU indication as ±X.XXXX°. Enter (and verify) this angle as ±X.XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

84. Enter (and verify) VERB 43 into G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

85. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

86. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

87. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

88. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

89. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. SCS LOADS NORMAL shall light.

90. Monitor Yaw body error ψ_{SC} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

91. Observe the PAVM and obtain best possible null using OG CDU thumbwheel.

92. Observe the PAVM and adjust the MG CDU thumbwheel until PAVM indicates approximately + 1.25 volts. Insure that increasing angle on CDU results in positive voltage indication.

93. Measure the Yaw body error phase angle on PAVM. Record indication and sign.

94. Observe the PAVM and obtain best possible in-phase null using MG CDU thumbwheel.

95. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

96. Set FUNCTION switch on PAVM to TOTAL. Measure and record the PAVM indication.

97. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain -10 mv on 30 mv scale using MG CDU. Note the time interval for the error signal to

drift from null to + 25 mv.

NOTE: Read and understand steps 98 through 109 before proceeding. These steps must be accomplished as quickly as possible without interruption.

98. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

99. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

100. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

101. Enter + 50000 into G and N AGC DSKY. DO NOT press ENTER pushbutton

102. Observe the PAVM and obtain -30 mv signal on 30 mv scale using MG CDU. When the PAVM passes through -25 mv, start timing the time interval obtained in step 97.

103. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC. Press ENTER pushbutton on G and N AGC DSKY.

104. Using dc probes monitor Yaw body error ψ_{SC} on PSA Adapter Tray 9, pins 34 (high) and 38 (low).

105. At the end of the time interval started in step 104, record the DVM indication on the data sheet.

106. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR.

107. Set DVM to OFF.

108. Set controls on PAVM as follows:

FUNCTION to 0°

DEGREES to 0°

109. Monitor Yaw body error ψ_{SC} at 45A7J1, pins 7 (high) and 8 (low) with ac probes on PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

110. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

111. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

112. Depending upon the test site location, enter (and verify) the appropriate angle into the G and N AGC DSKY. (See chart below). Press ENTER pushbutton.

SITE LOCATION	Angle
ACSP	+ 07540
NAA	+ 06643
AMR	+ 0----
MIT	+ 07487
MSC	+ 06206

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113. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 60 seconds before proceeding.

114. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

115. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

116. Repeat step 115 twice.

CAUTION: During the following step, exercise adequate care to prevent damaging strain to connecting cables.

117. Observe the IG CDU indicator and carefully tilt the G and N Mounting Fixture until the IG CDU indicator reads 000.00°. Insure that at least 90 seconds has elapsed since performing step 116 before proceeding.

118. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

119. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

120. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

121. Repeat step 120 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

122. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

123. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry.

124. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS ENTRY pushbutton shall light.

125. Using ac probes monitor Roll body offset error ϕ_{NB} on PSA Adapter Tray 9, pins 35 (high) and 38 (low).

126. After at least 90 seconds has elapsed since performing step 123, enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

127. Observe the OG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

128. Enter + 00000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

129. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

130. Enter (and verify) + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

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131. Enter (and verify) - 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

132. Enter (and verify) + 00000 into G and N AGC DSKY. Press ENTER pushbutton. The ENTRY Mode lamp on the IMU CONTROL panel shall be the only mode lamp that lights.

133. Using OG CDU thumbwheel, adjust OG CDU until a null is obtained on the . 01 volt scale of PAVM. Record OG CDU indication on calculation sheet.

134. Release thumbwheel of OG CDU and record OG CDU indication on calculation sheet.

135. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton.

136. Algebraically subtract indication of step 134 from indication of step 133 and enter (and verify) the result into the G and N AGC DSKY as ±XXX. XX degrees. Press ENTER pushbutton.

137. Enter (and verify) + 00000 into G and N AGC DSKY twice. Press ENTER pushbutton after each entry.

NOTE: PAVM indication will oscillate. Determine peak to peak excursion and choose midpoint of excursion when making measurements in steps 138 and 144.

138. Observe PAVM indication on . 1 volt scale. If indication remains on scale, record value and sign of midpoint of excursions on calculation sheet. If INDICATION DOES NOT remain fully on scale, repeat steps 136 through 138 adjusting the DSKY ENTRY of step 136 slightly until indication does stay on scale, and then record midpoint.

NOTE: Changing DSKY entry by ±000. 01 will change reading by 0. 048 volts.

139. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 235 to measure OGA 16X error at 56P9 pins 27 (high) and 26 (low) on the PAVM. Record midpoint of excursion on calculation sheet. (The PAVM voltage scale setting may be changed if necessary.) Return CROSSBAR CONTROL to 199.

140. Algebraically add + 00031 to indication in row 1 of AGC DSKY.

141. Enter (and verify) VERB 45 into G and N AGC DSKY. Press ENTER pushbutton. Enter result of addition in step 140 into G and N AGC DSKY as ±XXXXX. Press ENTER pushbutton.

142. Enter + 00000 into G and N AGC DSKY twice, pressing the ENTER pushbutton after each entry. Wait 20 seconds before proceeding.

143. Record the indication and sign on 3 volt scale of PAVM on calculation sheet.

144. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 235 and record PAVM indication and sign on calculation sheet. Return CROSSBAR CONTROL to 199.

145. Monitor Roll body offset error ϕ_{NB} at 45A7J1, pins 27 (high) and 28 (low) using ac probes on the PSA Adapter. Record PAVM indication on calculation sheet and verify that indication is positive.

146. Monitor Roll body offset error ϕ_{NB} on PSA Adapter Tray 9, pins 35 (high) and 38 (low) using ac probes. Verify that PAVM indication is positive.

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147. Measure Roll body offset error phase angle on PAVM. Record indication and sign.

148. Use the OUTER GIMBAL CDU thumbwheel to obtain a fine null on the 0. 003 scale of PAVM. Drift may be observed on PAVM. Obtain best possible null and then hold thumbwheel in subsequent steps 149 and 150.

149. Set FUNCTION switch on PAVM to 90°. Measure and record the PAVM indication (and sign).

150. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication. Release the thumbwheel.

151. Algebraically subtract indication recorded in step 138 from that recorded in step 143 on calculation sheet. Record result on data sheet.

152. Algebraically subtract indication recorded in step 139 from that recorded in step 144 on calculation sheet. Record result on data sheet.

153. Enter VERB 01, NOUN 02 into G and N AGC DSKY. Press ENTER pushbutton.

154. Enter address 00007$_8$ into G and N AGC DSKY. AGC display shall indicate contents of mode register 3 in row 1 as 50140.

155. Set controls on PAVM as follows:

FUNCTION to 0°

DEGREES to 0°

156. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

157. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

158. Enter (and verify) -03250 into the G and N AGC DSKY. Press ENTER pushbutton.

159. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

160. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

161. Enter (and verify) +00000 into G and N AGC DSKY. Press ENTER pushbutton.

162. Repeat step 161 twice.

CAUTION: During the following step, exercise adequate care to prevent damaging strain to connecting cables.

163. Observe the IG CDU indicator and carefully tilt the G and N Mounting Fixture until the IG CDU indicator reads 000. 00°.

164. After at least 90 seconds has elapsed since performing step 162 enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

165. Observe the OG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

166. Observe the IG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

167. Observe the MG CDU indication as

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±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

168. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

169. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

170. Observe the PAVM and obtain best possible null using IG CDU thumbwheel.

171. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

172. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

173. Monitor Roll body error ϕ_{SC} on PSA Adapter Tray 9, pins 35 (high) and 38 (low) with ac probes.

174. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS NORMAL pushbutton shall light.

175. Observe the PAVM and adjust OG CDU thumbwheel until PAVM indicates approximately + 1.25 volts. Insure that increasing angle on CDU results in positive voltage indication.

176. Measure the Roll body error phase angle on PAVM and let PAVM degrees dial remain at this indication. Record indication (and sign).

177. Observe the PAVM and obtain best possible in-phase null using OG CDU thumbwheel.

178. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

179. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication.

NOTE: Perform steps 180 thru 188 as quickly as possible.

180. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain best possible null on 10 mv scale using OG CDU.

181. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC.

182. Using dc probes monitor Roll body error ϕ_{SC} on PSA Adapter Tray 9, pins 35 (high) and 38 (low).

183. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

184. Enter + 50000 into the G and N AGC DSKY. Press ENTER pushbutton.

185. Enter + 00000 into the G and N AGC DSKY twice pressing ENTER pushbutton after each entry.

186. Record the DVM indication

on the data sheet.

187. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR. Set DVM to OFF.

188. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

189. Monitor Roll body error ϕ_{SC} at 45A7J1, pins 14 (high) and 15 (low) using ac probes on PSA Adapter. Verify that PAVM indication is positive and record value on calculation sheet.

190. Enter (and verify) VERB 40, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. Wait at least 75 seconds before proceeding.

191. Enter (and verify) VERB 41, NOUN 20 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

192. Enter (and verify) + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

193. Repeat step 192 twice. After the second entry the VERB-NOUN display shall stop flashing and indicate 41-22. Wait at least 60 seconds before proceeding.

194. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

195. Enter + 00000 into G and N AGC DSKY three times and press ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding.

196. Enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

197. Observe the OG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

198. Observe the IG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

199. Observe the MG CDU indication as ±X. XXXX°. Enter (and verify) this angle as ±X. XX00° into the G and N AGC DSKY. Press ENTER pushbutton.

200. Enter (and verify) VERB 43 into G and N AGC DSKY. Press ENTER pushbutton. The CDU MANUAL lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

201. Press SCS LOADS NORMAL/SCS LOADS ENTRY pushbutton on the TEST CONTROL panel. The SCS LOADS ENTRY pushbutton shall light.

202. Monitor Yaw body offset error ψ_{NB} on PSA Adapter Tray 9, pins 34 (high) and 38 (low) with ac probes.

203. Observe the PAVM and obtain best possible null on 30 mv scale using MG CDU thumbwheel.

204. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) with ac probes.

205. Observe the PAVM and adjust the IG CDU thumbwheel until PAVM indicates approximately + 1.5 volts. Insure that increasing angle on CDU results in positive voltage indication.

206. Measure the Pitch error phase angle on the PAVM and let PAVM degrees dial remain at this indication. Record indication (and sign).

207. Observe the PAVM and obtain best possible in-phase null using IG CDU thumbwheel.

208. Set FUNCTION switch on the PAVM to 90°. Measure and record the PAVM indication and sign.

209. Set FUNCTION switch on the PAVM to TOTAL. Measure and record the PAVM indication.

NOTE: Perform steps 210 thru 220 as quickly as possible.

210. Set FUNCTION switch on PAVM to 0°. Observe the PAVM and obtain best possible null on 10 mv scale using IG CDU.

211. Set VOLTMETER INPUT to DVM SIG 2 on PRIMARY SIGNAL SELECTOR. Set PAVM to OFF. Insure that DVM FUNCTION switch is set to AC.

212. Using dc probes monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low).

213. Enter VERB 54 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

214. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

215. Enter + 50000 into the G and N AGC DSKY. Press ENTER pushbutton.

216. Enter + 00000 into the G and N AGC DSKY. Press ENTER pushbutton.

217. Record the DVM indication on the data sheet.

218. Set VOLTMETER INPUT to PAVM SIG 1 on PRIMARY SIGNAL SELECTOR. Set DVM to OFF.

219. Set controls on PAVM as follows:

FUNCTION to 0°
DEGREES to 0°

220. Monitor Pitch error θ at 45A7J1, pins 20 (high) and 21 (low) with ac probes on the PSA Adapter. Verify that PAVM indication is positive and record on calculation sheet.

221. Enter (and verify) VERB 41, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

222. Enter + 09000 into G and N AGC DSKY. Press ENTER pushbutton.

223. Enter + 00000 into G and N AGC DSKY twice pressing ENTER pushbutton after each entry. Wait at least 60 seconds before proceeding.

224. Enter (and verify) VERB 43 into the G and N AGC DSKY. Press ENTER pushbutton.

225. Monitor Pitch error θ on PSA Adapter Tray 9, pins 37 (high) and 38 (low) using ac probes.

226. Observe the PAVM and obtain best possible null using MG CDU thumbwheel.

227. Enter (and verify) VERB 54 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

228. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

229. Enter + 00000 into G and N AGC DSKY. Press ENTER pushbutton.

230. Enter + 50000 into G and N AGC DSKY. Press ENTER pushbutton.

231. Verify that the PAVM indication is positive (approximately + 1.5 volts).

232. Enter (and verify) VERB 41, NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-22.

233. Enter + 00000 into G and N AGC DSKY three times pressing ENTER pushbutton after each entry. Wait at least 60 seconds before proceeding.

234. Enter (and verify) VERB 42 into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-67.

235. Enter + 00000 into G and N AGC DSKY three times pressing the ENTER pushbutton after each entry. Wait at least 90 seconds before proceeding. Repeat steps 196 thru 199.

236. Enter (and verify) VERB 44 (ATTITUDE CONTROL mode) into the G and N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 21-23.

237. Enter +00500 into G and N AGC DSKY three times, pressing the ENTER pushbutton after each entry. The ATT CONT lamp shall be the only mode lamp on the IMU CONTROL panel that lights.

238. Record INNER IMU CDU DIFFERENCE meter indication.

239. Record MIDDLE IMU CDU DIFFERENCE meter indication.

240. Record OUTER IMU CDU DIFFERENCE meter indication.

241. Enter (and verify) VERB 11, NOUN 01 into the G and N AGC DSKY. Press ENTER pushbutton.

242. Enter 00007_8 into G and N AGC DSKY. Press ENTER pushbutton. AGC display shall indicate contents of mode register 3 in row 1 as 50060.

243. Enter VERB 42, NOUN 67 into G and N AGC DSKY. Press ENTER pushbutton.

244. Enter VERB 33 in G and N AGC DSKY. Press ENTER pushbutton.

245. Enter (and verify) VERB 41, NOUN 20

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SUBSYSTEM G AND N SYSTEM | ASSY

into G and N AGC DSKY. Press ENTER pushbutton. The G and N AGC DSKY shall flash and indicate 21-22.

2 6. Enter (and verify) VERB 33 into G and N AGC DSKY. Press ENTER pushbutton.

247. Enter (and verify) VERB 33 into G and N AGC DSKY. Press ENTER pushbutton. The COARS ALIGN mode lamp on the IMU CONTROL panel is the only mode lamp that is lighted.

248. Pressing of any of the mode pushbuttons on the IMU CONTROL panel shall not cause any of the mode lamps to light or go out.

249. Tilt the G and N Mounting Fixture to the 32.5 ± 0.5 degree position.

250. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 73}}{\text{Magnitude of step 69}}$$

Record on data sheet.

251. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 109}}{\text{Magnitude of step 105}}$$

Record on data sheet.

252. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 145}}{\text{Magnitude of step 143}}$$

Record on data sheet.

253. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 189}}{\text{Magnitude of step 186}}$$

Record on data sheet.

254. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 220}}{\text{Magnitude of step 217}}$$

Record on data sheet.

255. Calculate the following ratio on the calculation sheet:

$$\text{Ratio} = \frac{\text{Magnitude of step 105}}{\text{Magnitude of step 69}}$$

Record on data sheet.

DATE ______

TDRR 21539 AUG 12 1965

APOLLO G&N
EQUIPMENT TEST
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INITIAL TDRR ______

JOB AGC MODE CONTROL TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
9	OUTER GIMBAL CDU	deg	-0.006				+0.006		
9	MIDDLE GIMBAL CDU	deg	-0.006				+0.006		
9	INNER GIMBAL CDU	deg	-0.006				+0.006		
16	IG time	sec	0				5.0		
20	MG time	sec	0				5.0		
25	OG time	sec	0				5.0		
28	IG IMU CDU DIFF	deg	-1.0				+1.0		
28	MG IMU CDU DIFF	deg	-1.0				+1.0		
28	OG IMU CDU DIFF	deg	-1.0				+1.0		
29a	IG CDU 1X error	mv rms	0				150		
29b	MG CDU 1X error	mv rms	0				150		
29c	OG CDU 1X error	mv rms	0				150		
29d	IGA 1X-sine	volts rms	20.25				24.75		
29e	IGA 1X cosine	volts rms	11.7				14.3		

* TO BE USED AS REQUIRED OR DESIRED

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 6

JDC NO. 10084
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JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
29f	MGA 1X sine	volts rms	20.25				24.75		
29g	MGA 1X cosine	volts rms	11.7				14.3		
29h	OGA 1X sine	volts rms	20.25				24.75		
29i	OGA 1X cosine	volts rms	11.7				14.3		
30a	MGA 1X sine	deg	+1.0				+11.0		
30b	MGA 1X sine	deg	+1.0				+11.0		
30c	OGA 1X sine	deg	+1.0				+11.0		
30d	IGA 1X cosine	deg	+1.0				+11.0		
30e	MGA 1X cosine	deg	+1.0				+11.0		
30f	OGA 1X cosine	deg	+1.0				+11.0		
36a	IG CDU 16X error **	mv rms	-24.0				+24.0		
36b	MG CDU 16X error **	mv rms	-24.0				+24.0		
36c	OG CDU 16X error **	mv rms	-24.0				+24.0		
57	Yaw error ψ_{NB} Phase Shift	deg	-5.5				+5.5		
59	Yaw error ψ_{NB} Quad**	mv rms	-124				+124		
60	Yaw error ψ_{NB} Total**	mv rms	0				125		

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using the 'MULT BY' factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 6

JDC NO. 10084
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JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES			MAX VALUE	REJ	ACC
				1st	2nd*	3rd*			
69	Yaw body offset error ψ_{NB} (S/C)	volts rms	1.42				1.58		
9?	Yaw error ψ_{SC} Phase Angle	deg	-5.5				+5.5		
95	Yaw error ψ_{SC} Quad. **	mv rms	-124				+124		
96	Yaw error ψ_{SC} Total**	mv rms	0				125		
105	Yaw body error ψ_{SC} (S/C)	volts rms	1.19				1.33		
147	Roll error ϕ_{NB} Phase Shift	deg	-5.5				+5.5		
149	Roll error ϕ_{NB} Quad. **	mv rms	-124				+124		
150	Roll error ϕ_{NB} Total**	mv rms	0				125		
151	Roll body offset error ϕ_{NB}(S/C)**	volts rms	+1.35				+1.65		
152	OGA 16X error	volts	-2.05				-2.51		
176	Roll error ϕ_{SC} Phase angle	deg	-5.5				+5.5		
178	Roll error ϕ_{SC} Quad. **	mv rms	-124				+124		
179	Roll error ϕ_{SC} Total**	mv rms	0				125		
186	Roll body error ϕ_{SC} (S/C)	volts	1.19				1.33		
206	Pitch error θ Phase Angle	deg	-8.9				+2.3		

* TO BE USED AS REQUIRED OR DESIRED
** Correct this measurement using the 'MULT BY' factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

DATE ______

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EQUIPMENT TEST
DATA SHEET 4 OF 6

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JOB AGC MODE CONTROL TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUES 1st	2nd*	3rd*	MAX VALUE	REJ	ACC
208	Pitch error θ Quad.**	mv rms	-124				+ 124		
209	Pitch error θ Total**	mv rms	0				125		
217	Pitch body & offset Error θ (S/C)	volts rms	1.42				1.58		
238	IG IMU CDU DIFF	deg	-4.0				-5.0		
239	MG IMU CDU DIFF	deg	-4.0				-5.0		
240	OG IMU CDU DIFF	deg	-4.0				-5.0		
250	Yaw body offset Error ratio		0.9				1.1		
251	Yaw body Error ratio		0.9				1.1		
252	Roll body offset Error ratio		0.9				1.1		
253	Roll body error ratio		0.9				1.1		
254	Pitch error ratio		0.9				1.1		
255	Yaw body to yaw offset error ratio		0.797				0.881		
	G&N AGC DSKY displays			DSKY displays were in accordance with those specified throughout the JDC.					
	G&N lamp displays			Lamp displays were in accordance with those specified throughout the JDC.					

* TO BE USED AS REQUIRED OR DESIRED
**Correct this measurement using the 'MULT BY' factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

DATE __________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 6

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JOB AGC MODE CONTROL TEST

JDC ITEM NUMBER	CALCULATION PARAMETER	SIGN	VALUE	UNITS
73	Yaw body offset error ψ_{NB} (5°) (PSA)	+		volts rms
109	Yaw body error ψ_{SC} (5°) (PSA)	+		volts rms
133	OG CDU			degrees
134	OG CDU			degrees
138				volts rms
139				volts rms
143				volts rms
144				volts rms
145	Roll body offset error ϕ_{NB} (5°) (PSA)	+		volts rms
151	(Step 143 above) - (sign and magnitude of step 138 above)			volts rms
152	(Step 144 above) - (Sign and magnitude of step 139 above)			volts rms
189	Roll body error ϕ_{SC} (5°) (PSA)	+		volts rms
220	Pitch error θ (5°) (PSA)	+		volts rms
250	(Step 73 above) ÷ (Step 69)	+		
251	(Step 109 above) ÷ (Step 105)	+		
252	(Step 145 above) ÷ (Step 143)	+		

REMARKS:

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 6

JDC
NO. 10084
REV. ______

JOB AGC MODE CONTROL TEST

JDC ITEM NUMBER	CALCULATION PARAMETER	SIGN	VALUE	UNITS
253	(Step 189 above) ÷ (Step 186)	+		
254	(Step 220 above) ÷ (Step 217)	+		
255	(Step 105) ÷ (Step 69)	+		

JOB G & N FINE ALIGNMENT TEST
JDC 10091 REV. A PAGE 1 OF 3
INITIAL TDRR 21539 D.S. PGS 4
SUBSYSTEM G & N SYSTEM
ASSY.

DESCRIPTION The misalignments of the entire G & N system, from the optics StLOS to each PIPA IA, are determined.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	9-21-65	22664	2,3	-	WK	ACM

REFERENCES ATP 1026000, Paragraph 3-3.9

IMPORTANT For systems so configured, insure that the OPTICS HOLD switch on the G and N Indicator Control panel is set to OFF. (Cont. below)

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000

IMPORTANT: Proceed with this JDC if JDC 10033 has been performed and power has not been interrupted. If power has been interrupted, perform JDC 10008 Part III before proceeding.

1. Insure that the G & N mounting fixture is tilted to 32.5 (±0.5) degrees.

2. Set TRANSFER switch on IMU CONTROL panel to COMPUTER.

3. Set optics mode selector on G & N indicator control panel to ZERO OPTICS. The ZERO ENCODER light shall light and remain lighted until the optics have zeroed.

4. To establish the priority of the test in the AGC, enter and verify VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton.

5. Enter the priority 04000 into G & N AGC DSKY. Press ENTER pushbutton.

6. Enter VERB 20 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

7. Enter 55717 into G & N AGC DSKY. Press ENTER pushbutton. MAJOR MODE lights shall display 04.

8. When VERB 07 NOUN 30 flashes, read and compare contents of R1 and R2 to the latitude display columns of Table 1. If the display is correct for the test location proceed to step 16. If not, proceed with step 9.

9. Enter VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

10. Enter address 01227 into G & N AGC DSKY. Press ENTER pushbutton.

11. Select and enter the correct value of latitude from the load columns in Table 1 into G & N AGC DSKY. Press ENTER pushbutton.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE ________

JOB G & N FINE ALIGNMENT TEST
JDC 10091 REV A PAGE 2 OF 3
SUBSYSTEM G & N SYSTEM
ASSY

TABLE I

LATITUDE OF TEST SITE

LOCATION	DSKY LOAD		LATITUDE DISPLAYS	
	LATITUDE	LATITUDE + 1	CONTENTS R1	CONTENTS R2
MIT			+ 11767	82399
ACSP	+ 01952	+ 45195	+ 11916	82107
NAA	+ 01543	+ 81021	+ 09422	66955
MSC	+ 01345	+ 14663	+ 08210	12333
MILA	+ 01297	+ 79484	+ 07921	11121

12. Enter VERB 21 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

13. Enter address 01230 into G & N AGC DSKY. Press ENTER pushbutton.

14. Select and enter the correct value of latitude + 1 from the load columns in Table 1 into G & N AGC DSKY. Press ENTER pushbutton.

15. Verify that R1 and R2 contain the values of latitude and latitude + 1 respectively from the display columns of Table 1. If the display is incorrect repeat steps 9 through 15, otherwise proceed to step 16.

16. Enter VERB 33 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 21-30 flashing. Enter 00001 into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter 00000 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 51-30 flashing and R_1 shall indicate 00001.

18. Set the Optics mode switch to MANUAL and the CONTROLLER SPEED switch to HI. Use the optics control stick to drive the optics until the SHAFT and 2X TRUNNION CDU dials indicate approximately 180.0° and 65.0° respectively.

19. With CONTROLLER SPEED switch set to LO, use the control stick to position the center of the SXT vertical and horizontal reticle lines until it is approaching the central dot of target #1. Press MARK pushbutton at the instant of coincidence. If satisfied with MARK proceed to step 20. If not, repeat step 19.

20. Enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 51-30 and R_1 shall indicate 00004.

21. Set the CONTROLLER SPEED switch to HI. Using optics control stick, drive the optics until the SHAFT and 2X TRUNNION CDU's indicate approximately 241.0° and

DATE ________

JOB G & N FINE ALIGNMENT TEST
JDC 10091 REV A PAGE 3 OF 3
SUBSYSTEM G & N SYSTEM
ASSY

106.6° respectively.

22. With the CONTROLLER SPEED switch set to LO, use the control stick to position the center of the SXT vertical and horizontal lines until it is approaching the central dot of Target #4. Press MARK pushbutton at the instant of coincidence. If satisfied with MARK proceed to step 23. If not, repeat step 22.

23. Enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

24. When the VERB-NOUN display indicates 51-30 flashing, and R_1 indicates 00001, repeat steps 18 through 23.

25. In approximately 7 minutes VERB 06 NOUN 66 will flash, and the G & N AGC DSKY display will be as follows:

R1 = sec arc misalignment
R2 = fractional sec arc misalignment

Record R1 and R2 on the data sheets in the spaces provided.

26. Enter VERB 33 into G & N AGC DSKY. Press ENTER pushbutton.

27. The contents of G & N AGC DSKY display R1 and R2 are the misalignment of the second horizontal PIPA. Record R1 and R2 on the data sheets.

28. Enter VERB 34 into G & N AGC DSKY. Press ENTER pushbutton and observe that MAJOR MODE lights display 00.

29. Repeat steps 3 through 28 twice with the following changes in step 16.
  - a. Enter 00002 for first test.
  - b. Enter 00003 for second test.

30. Enter VERB 41 NOUN 20 into G and N AGE DSKY. Press ENTER pushbutton. Enter + 00000 into G and N AGC DSKY three times pressing ENTER pushbutton after each entry.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 4

CONFIDENTIAL
(When Filled In)

JDC
NO. 10091
REV. A
INITIAL TDRR 21539

JOB G & N FINE ALIGNMENT TEST

ASSEMBLY UNDER TEST
TITLE ____________
SER. NO. ______ DWG ______ REV. ___

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ____________ SER. NO. ______ ______ CAL DATE
NAME ____________ SER. NO. ______ ______ CAL DATE

CONDUCTED BY ____________ NAME/AFFILIATION APPROVED BY ____________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
25	Y PIPA About Z G & N MISALIGNMENT,00001 entered in Step 16	sec arc	▨	R_1 R_2 ( )_____.__XXX	▨	▨	▨	a
27	Z PIPA ABOUT Y G & N MISALIGNMENT, 00001 entered in Step 16	sec arc	▨	R_1 R_2 ( )_____.__XXX	▨	▨	▨	b
29.a.25	X PIPA ABOUT Y G & N MISALIGNMENT,00002 entered in Step 16	sec arc	▨	R_1 R_2 ( )_____.__XXX	▨	▨	▨	c
29.a.27	Y PIPA ABOUT X G & N MISALIGNMENT,00002 entered in Step 16	sec arc	▨	R_1 R_2 ( )_____.__XXX	▨	▨	▨	d
29.b.25	X PIPA ABOUT Z G & N MISALIGNMENT, 00003 entered in Step 16	sec arc	▨	R_1 R_2 ( )_____.__XXX	▨	▨	▨	e

CONFIDENTIAL
(When Filled In)

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 4

CONFIDENTIAL
(When Filled In)

JDC
NO. 10091
REV. A

JOB G & N FINE ALIGNMENT TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
29.b.27	Z PIPA ABOUT X G & N MISALIGNMENT, 00003 entered in Step 16	sec arc	▨	R_1 R_2 ( )_ _ _ _ _ . _ _ X X X	▨	▨	▨
3 7 8 15 16 17 20 24 25 28	Lamps and AGC DSKY indications	All lamps and DSKY displays and indications reacted as specified. (Record all discrepancies in Remarks portion of data sheet.)					

REMARKS:

CONFIDENTIAL
(When Filled In)

DATE ______

APOLLO G & N
EQUIPMENT TEST
ATA SHEET 3 OF 4

CONFIDENTIAL
(When Filled In)

JDC
NO. 10091
REV. A

JOB G & N FINE ALIGNMENT TEST

CALCULATIONS

Enter the latest values:

X PIPA Bias (JDC 10089) ______________ cm/sec^2
Y PIPA Bias (JDC 10089) ______________ cm/sec^2
Z PIPA Bias (JDC 10089) ______________ cm/sec^2

θ_x = 210 (X PIPA Bias) = ____________ sec arc
θ_Y = 210 (Y PIPA Bias) = ____________ sec arc
θ_Z = 210 (Z PIPA Bias) = ____________ sec arc

Line a - θ_Y = ____________ enter on line g
Line b - θ_Z = ____________ enter on line h
Line c - θ_X = ____________ enter on line i
Line d - θ_Y = ____________ enter on line j
Line e - θ_X = ____________ enter on line k
Line f - θ_Z = ____________ enter on line l

CONFIDENTIAL
(When Filled In)

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 4

JDC
NO. 10091
REV. A

JOB G & N FINE ALIGNMENT TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
25	Y PIPA ABOUT Z (Bias corrected)	sec arc	-120		+120			(g)
27	Z PIPA ABOUT Y (Bias corrected)	sec arc	-120		+120			(h)
29.a. 25	X PIPA ABOUT Y (Bias corrected)	sec arc	-120		+120			(i)
29.a. 27	Y PIPA ABOUT X (Bias corrected)	sec arc	-120		+120			(j)
29.b. 25	X PIPA ABOUT Z (Bias corrected)	sec arc	-120		+120			(k)
29.b. 27	Z PIPA ABOUT X (Bias corrected)	sec arc	-120		+120			(l)

DATE ______

JOB G & N FINE ALIGNMENT TEST

JDC 10091 **REV.** B **PAGE** 1 **OF** 3

INITIAL TDRR 21539 **D.S. PGS** 4

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION The misalignments of the entire G & N system, from the optics StLOS to each PIPA IA, are determined.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-21-65	22664	2,3	-	WK	ACM
B	11-30-65	24452	-	4	WK	TM

REFERENCES ATP 1026000, Paragraph 3-3.9

IMPORTANT For systems so configured, insure that the OPTICS HOLD switch on the G and N Indicator Control panel is set to OFF. (Cont. below)

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000

IMPORTANT: Proceed with this JDC if JDC 10033 has been performed and power has not been interrupted. If power has been interrupted, perform JDC 10008 Part III before proceeding.

1. Insure that the G & N mounting fixture is tilted to 32.5 (±0.5) degrees.

2. Set TRANSFER switch on IMU CONTROL panel to COMPUTER.

3. Set optics mode selector on G & N indicator control panel to ZERO OPTICS. The ZERO ENCODER light shall light and remain lighted until the optics have zeroed.

4. To establish the priority of the test in the AGC, enter and verify VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton.

5. Enter the priority 04000 into G & N AGC DSKY. Press ENTER pushbutton.

6. Enter VERB 20 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

7. Enter 55717 into G & N AGC DSKY. Press ENTER pushbutton. MAJOR MODE lights shall display 04.

8. When VERB 07 NOUN 30 flashes, read and compare contents of R1 and R2 to the latitude display columns of Table 1. If the display is correct for the test location proceed to step 16. If not, proceed with step 9.

9. Enter VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

10. Enter address 01227 into G & N AGC DSKY. Press ENTER pushbutton.

11. Select and enter the correct value of latitude from the load columns in Table 1 into G & N AGC DSKY. Press ENTER pushbutton.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 12 AUG 65

JOB G & N FINE ALIGNMENT TEST

JDC 10091 **REV** B **PAGE** 2 **OF** 3

SUBSYSTEM G & N SYSTEM

ASSY

TABLE I

LATITUDE OF TEST SITE

LOCATION	DSKY LOAD		LATITUDE DISPLAYS	
	LATITUDE	LATITUDE + 1	CONTENTS R1	CONTENTS R2
MIT			+ 11767	82399
ACSP	+ 01952	+ 45195	+ 11916	82107
NAA	+ 01543	+ 81021	+ 09422	66955
MSC	+ 01345	+ 14663	+ 08210	12333
MILA	+ 01297	+ 79484	+ 07921	11121

12. Enter VERB 21 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

13. Enter address 01230 into G & N AGC DSKY. Press ENTER pushbutton.

14. Select and enter the correct value of latitude + 1 from the load columns in Table 1 into G & N AGC DSKY. Press ENTER pushbutton.

15. Verify that R1 and R2 contain the values of latitude and latitude + 1 respectively from the display columns of Table 1. If the display is incorrect repeat steps 9 through 15, otherwise proceed to step 16.

16. Enter VERB 33 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 21-30 flashing. Enter 00001 into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter 00000 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 51-30 flashing and R_1 shall indicate 00001.

18. Set the Optics mode switch to MANUAL and the CONTROLLER SPEED switch to HI. Use the optics control stick to drive the optics until the SHAFT and 2X TRUNNION CDU dials indicate approximately 180.0° and 65.0° respectively.

19. With CONTROLLER SPEED switch set to LO, use the control stick to position the center of the SXT vertical and horizontal reticle lines until it is approaching the central dot of target #1. Press MARK pushbutton at the instant of coincidence. If satisfied with MARK proceed to step 20. If not, repeat step 19.

20. Enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 51-30 and R_1 shall indicate 00004.

21. Set the CONTROLLER SPEED switch to HI. Using optics control stick, drive the optics until the SHAFT and 2X TRUNNION CDU's indicate approximately 241.0° and 106.6° respectively.

DATE 12 AUG 65

JOB G & N FINE ALIGNMENT TEST

JDC 10091 **REV** B **PAGE** 3 **OF** 3

SUBSYSTEM G & N SYSTEM

ASSY

22. With the CONTROLLER SPEED switch set to LO, use the control stick to position the center of the SXT vertical and horizontal lines until it is approaching the central dot of Target #4. Press MARK pushbutton at the instant of coincidence. If satisfied with MARK proceed to step 23. If not, repeat step 22.

23. Enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

24. When the VERB-NOUN display indicates 51-30 flashing, and R_1 indicates 00001, repeat steps 18 through 23.

25. In approximately 7 minutes VERB 06 NOUN 66 will flash, and the G & N AGC DSKY display will be as follows:

R1 = sec arc misalignment

R2 = fractional sec arc misalignment

Record R1 and R2 on the data sheets in the spaces provided.

26. Enter VERB 33 into G & N AGC DSKY. Press ENTER pushbutton.

27. The contents of G & N AGC DSKY display R1 and R2 are the misalignment of the second horizontal PIPA. Record R1 and R2 on the data sheets.

28. Enter VERB 34 into G & N AGC DSKY. Press ENTER pushbutton and observe that MAJOR MODE lights display 00.

29. Repeat steps 3 through 28 twice with the following changes in step 16.

   a. Enter 00002 for first test.

   b. Enter 00003 for second test.

30. Enter VERB 41 NOUN 20 into G and N AGE DSKY. Press ENTER pushbutton. Enter + 00000 into G and N AGC DSKY three times pressing ENTER pushbutton after each entry.

DATE 12 AUG 65

CONFIDENTIAL
(When Filled In)

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 4

JDC
NO. 10091
REV. B
INITIAL TDRR 21539

JOB G & N FINE ALIGNMENT TEST

ASSEMBLY UNDER TEST

TITLE ____

SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION

TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE

NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
25	Y PIPA About Z G & N MISALIGNMENT,00001 entered in Step 16	sec arc	▨	R_1 R_2 ( )_ _ _ _ _ . _ _ X X X	▨	▨	▨	a
27	Z PIPA ABOUT Y G & N MISALIGNMENT, 00001 entered in Step 16	sec arc	▨	R_1 R_2 ( )_ _ _ _ _ . _ _ X X X	▨	▨	▨	b
29.a.25	X PIPA ABOUT Y G & N MISALIGNMENT,00002 entered in Step 16	sec arc	▨	R_1 R_2 ( )_ _ _ _ _ . _ _ X X X	▨	▨	▨	c
29.a.27	Y PIPA ABOUT X G & N MISALIGNMENT,00002 entered in Step 16	sec arc	▨	R_1 R_2 ( )_ _ _ _ _ . _ _ X X X	▨	▨	▨	d
29.b.25	X PIPA ABOUT Z G & N MISALIGNMENT, 00003 entered in Step 16	sec arc	▨	R_1 R_2 ( )_ _ _ _ _ . _ _ X X X	▨	▨	▨	e

CONFIDENTIAL
(When Filled In)

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 4

CONFIDENTIAL
(When Filled In)

JDC
NO. 10091
REV. B

JOB G & N FINE ALIGNMENT TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
29.b.27	Z PIPA ABOUT X G & N MISALIGNMENT, 00003 entered in Step 16	sec arc	▨	R_1 R_2 ( )_____.__XXX	▨	▨	▨
3 7 8 15 16 17 20 24 25 28	Lamps and AGC DSKY indications	All lamps and DSKY displays and indications reacted as specified. (Record all discrepancies in Remarks portion of data sheet.)					

f

REMARKS:

CONFIDENTIAL
(When Filled In)

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
ATA SHEET 3 OF 4

CONFIDENTIAL
(When Filled In)

JDC
NO. 10091
REV. B

JOB G & N FINE ALIGNMENT TEST

CALCULATIONS

Enter the latest values:

X PIPA Bias (JDC 10089) ____________ cm/sec²

Y PIPA Bias (JDC 10089) ____________ cm/sec²

Z PIPA Bias (JDC 10089) ____________ cm/sec²

θ_x = 210 (X PIPA Bias) = __________ sec arc

θ_y = 210 (Y PIPA Bias) = __________ sec arc

θ_z = 210 (Z PIPA Bias) = __________ sec arc

Line a - θ_y = ____________ enter on line g

Line b - θ_z = ____________ enter on line h

Line c - θ_x = ____________ enter on line i

Line d - θ_y = ____________ enter on line j

Line e - θ_x = ____________ enter on line k

Line f - θ_z = ____________ enter on line l

CONFIDENTIAL
(When Filled In)

DATE 12 AUG 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 4

JDC
NO. 10091
REV. B

JOB G & N FINE ALIGNMENT TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
25	Y PIPA ABOUT Z (Bias corrected)	sec arc	-150		+150			(g)
27	Z PIPA ABOUT Y (Bias corrected)	sec arc	-150		+150			(h)
29.a. 25	X PIPA ABOUT Y (Bias corrected)	sec arc	-150		+150			(i)
29.a. 27	Y PIPA ABOUT X (Bias corrected)	sec arc	-150		+150			(j)
29.b. 25	X PIPA ABOUT Z (Bias corrected)	sec arc	-150		+150			(k)
29.b. 27	Z PIPA ABOUT X (Bias corrected)	sec arc	-150		+150			(l)

DATE 12 AUG 65

TDRR 21539 AUG 12 1965

JOB G & N FINE ALIGNMENT TEST	JDC 10091 REV. ____ PAGE 1 OF 3 INITIAL TDRR ________ D.S. PGS 4
SUBSYSTEM G & N SYSTEM	ASSY.

DESCRIPTION The misalignments of the entire G & N system, from the optics StLOS to each PIPA IA, are determined.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES ATP 1026000, Paragraph 3-3.9

IMPORTANT For systems so configured, insure that the OPTICS HOLD switch on the G and N Indicator Control panel is set to OFF. (Cont. below)

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000

IMPORTANT: Proceed with this JDC if JDC 10033 has been performed and power has not been interrupted. If power has been interrupted, perform JDC 10008 Part III before proceeding.

1. Insure that the G & N mounting fixture is tilted to 32.5 (±0.5) degrees.

2. Set TRANSFER switch on IMU CONTROL panel to COMPUTER.

3. Set optics mode selector on G & N indicator control panel to ZERO OPTICS. The ZERO ENCODER light shall light and remain lighted until the optics have zeroed.

4. To establish the priority of the test in the AGC, enter and verify VERB 21 NOUN 26 into G & N AGC DSKY. Press ENTER pushbutton.

5. Enter the priority 04000 into G & N AGC DSKY. Press ENTER pushbutton.

6. Enter VERB 20 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

7. Enter 55717 into G & N AGC DSKY. Press ENTER pushbutton. MAJOR MODE lights shall display 04.

8. When VERB 07 NOUN 30 flashes, read and compare contents of R1 and R2 to the latitude display columns of Table 1. If the display is correct for the test location proceed to step 16. If not, proceed with step 9.

9. Enter VERB 21 NOUN 02 into G & N AGC DSKY. Press ENTER pushbutton.

10. Enter address 01227 into G & N AGC DSKY. Press ENTER pushbutton.

11. Select and enter the correct value of latitude from the load columns in Table 1 into G & N AGC DSKY. Press ENTER pushbutton.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB G & N FINE ALIGNMENT TEST	JDC 10091 REV PAGE 2 OF 3
SUBSYSTEM G & N SYSTEM	ASSY

TABLE I

LATITUDE OF TEST SITE

LOCATION	DSKY LOAD		LATITUDE DISPLAYS	
	LATITUDE	LATITUDE + 1	CONTENTS R1	CONTENTS R2
MIT			+ 11767	82399
ACSP	+ 01952	+ 45195	+ 11916	82107
NAA	+ 01543	+ 81021	+ 09422	66955
MSC	+ 01345	+ 14663	+ 08210	12333
MILA	+ 01297	+ 79484	+ 07921	11121

12. Enter VERB 21 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

13. Enter address 01230 into G & N AGC DSKY. Press ENTER pushbutton.

14. Select and enter the correct value of latitude + 1 from the load columns in Table 1 into G & N AGC DSKY. Press ENTER pushbutton.

15. Verify that R1 and R2 contain the values of latitude and latitude + 1 respectively from the display columns of Table 1. If the display is incorrect repeat steps 9 through 15, otherwise proceed to step 16.

16. Enter VERB 33 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 21-30 flashing. Enter 00001 into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter 00000 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall indicate 51-30 flashing and R_1 shall indicate 00001.

18. Set the Optics mode switch to MANUAL and the CONTROLLER SPEED switch to HI. Use the optics control stick to drive the optics until the SHAFT and 2X TRUNNION CDU dials indicate approximately 180.0° and 65.0° respectively.

19. With CONTROLLER SPEED switch set to LO, use the control stick to position the SXT central horizontal reticle line until it is approaching the horizontal reticle line and dot of target #1. Press MARK pushbutton at the instant of coincidence. If satisfied with MARK proceed to step 20. If not, repeat step 19.

20. Enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display shall flash and indicate 51-30 and R_1 shall indicate 00004.

21. Set the CONTROLLER SPEED switch to HI. Using optics control stick, drive the optics until the SHAFT and 2X TRUNNION CDU's indicate approximately 241.0° and

DATE ______

JOB G AND N FINE ALIGNMENT TEST	JDC 10091 REV PAGE 3 OF 3
SUBSYSTEM G AND N SYSTEM	ASSY

106.6° respectively.

22. With the CONTROLLER SPEED switch set to LO, use the control stick to position the SXT central reticle line until it is approaching the central dot of target #4. Press MARK pushbutton at the instant of coincidence. If satisfied with MARK proceed to step 23. If not, repeat step 22.

23. Enter VERB 52 into G and N AGC DSKY. Press ENTER pushbutton.

24. When the VERB-NOUN display indicates 51-30 flashing, and R_1 indicates 00001, repeat steps 18 through 23.

25. In approximately 7 minutes VERB 06 NOUN 66 will flash, and the G and N AGC DSKY display will be as follows:

R1 = sec arc misalignment

R2 = fractional sec arc misalignment

Record R1 and R2 on the data sheets in the spaces provided.

26. Enter VERB 33 into G and N AGC DSKY. Press ENTER pushbutton.

27. The contents of G and N AGC DSKY display R1 and R2 are the misalignment of the second horizontal PIPA. Record R1 and R2 on the data sheets.

28. Enter VERB 34 into G and N AGC DSKY. Press ENTER pushbutton and observe that MAJOR MODE lights display 00.

29. Repeat steps 3 through 28 twice with the following changes in step 16.

a. Enter 00002 for first test.

b. Enter 00003 for second test.

30. Enter VERB 41 NOUN 20 into G and N AGC DSKY. Press ENTER pushbutton. Enter +00000 into G and N AGC DSKY three times pressing ENTER pushbutton after each entry.

DATE ______

TDRR 21539 AUG 12 1965

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 4

CONFIDENTIAL
(When Filled In)

JDC NO. 10091
REV. ______
INITIAL TDRR ______

JOB G & N FINE ALIGNMENT TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE ______

NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
25	Y PIPA About Z G & N MISALIGNMENT,00001 entered in Step 16	sec arc	▨	R_1 R_2 ( )______.__XXX	▨	▨	▨	a
27	Z PIPA ABOUT Y G & N MISALIGNMENT, 00001 entered in Step 16	sec arc	▨	R_1 R_2 ( )______.__XXX	▨	▨	▨	b
29.a.25	X PIPA ABOUT Y G & N MISALIGNMENT,00002 entered in Step 16	sec arc	▨	R_1 R_2 ( )______.__XXX	▨	▨	▨	c
29.a.27	Y PIPA ABOUT X G & N MISALIGNMENT,00002 entered in Step 16	sec arc	▨	R_1 R_2 ( )______.__XXX	▨	▨	▨	d
29.b.25	X PIPA ABOUT Z G & N MISALIGNMENT, 00003 entered in Step 16	sec arc	▨	R_1 R_2 ( )______.__XXX	▨	▨	▨	e

CONFIDENTIAL
(When Filled In)

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 4

CONFIDENTIAL
(When Filled In)

JDC
NO. 10091
REV. ____

JOB G & N FINE ALIGNMENT TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
29.b.27	Z PIPA ABOUT X G & N MISALIGNMENT, 00003 entered in Step 16	sec arc	▨	R_1 R_2 ( )_____.__XXX	▨	▨	▨
3 7 8 15 16 17 20 24 25 28	Lamps and AGC DSKY indications	All lamps and DSKY displays and indications reacted as specified. (Record all discrepancies in Remarks portion of data sheet.)					

REMARKS:

CONFIDENTIAL
(When Filled In)

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 4

JDC
NO. 10091
REV. ____

JOB G & N FINE ALIGNMENT TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC	
25	Y PIPA ABOUT Z (Bias corrected)	sec arc	-120		+120			(g)
27	Z PIPA ABOUT Y (Bias corrected)	sec arc	-120		+120			(h)
29.a. 25	X PIPA ABOUT Y (Bias corrected)	sec arc	-120		+120			(i)
29.a. 27	Y PIPA ABOUT X (Bias corrected)	sec arc	-120		+120			(j)
29.b. 25	X PIPA ABOUT Z (Bias corrected)	sec arc	-120		+120			(k)
29.b. 27	Z PIPA ABOUT X (Bias corrected)	sec arc	-120		+120			(l)

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 OF 4

CONFIDENTIAL
(WHEN FILLED IN)

JDC
NO. 10091
REV. ____

JOB: G & N FINE ALIGNMENT TEST

CALCULATIONS

Enter the latest values:

X PIPA Bias (JDC 10089) ______________ cm/sec^2
Y PIPA Bias (JDC 10089) ______________ cm/sec^2
Z PIPA Bias (JDC 10089) ______________ cm/sec^2

θ_X = 210 (X PIPA Bias) = ____________ sec arc
θ_Y = 210 (Y PIPA Bias) = ____________ sec arc
θ_Z = 210 (Z PIPA Bias) = ____________ sec arc

Line a - θ_Y = ______________ enter on line g
Line b - θ_Z = ______________ enter on line h
Line c - θ_X = ______________ enter on line i
Line d - θ_Y = ______________ enter on line j
Line e - θ_X = ______________ enter on line k
Line f - θ_Z = ______________ enter on line l

CONFIDENTIAL
(WHEN FILLED IN)

DATE ________

JOB GYRO COMPASSING TEST
JDC 10092 **REV.** A **PAGE** 1 **OF** 5
INITIAL TDRR 21539 **D.S. PGS** 13
SUBSYSTEM G & N SYSTEM
ASSY.

DESCRIPTION This test demonstrates the ability of the gyro stabilized platform (in conjunction with the Prelaunch Alignment program) to maintain a local vertical erection with Z SM pointing at an azimuth of 90°. The effects of high and low prime power variation on power supply outputs is also demonstrated.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-21-65	22665	1, 2	10, 12	WK	ACM

REFERENCES Paragraphs 3-3.1 and 3-3.7 of ATP 1026000.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. This JDC cannot be performed within one-hour of performing JDC 10008, 10033, 10086.

1. Insure that G & N Mounting Fixture is tilted to 0.0°.

2. Set TRANSFER switch on IMU CONTROL panel to COMPUTER.

3. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton.

4. Enter (and verify) VERB 71 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display will indicate 51 XX.

NOTE: If NOUN XX is written in procedure disregard Noun indication. Look only for requested indications on AGC DSKY including R1, R2 and R3.

5. Insure that TRACKER POWER switch is set to OFF, TRACKER pushbutton light off, CONTROLLER MODE switch to DIRECT, Optics Mode switch to ZERO OPTICS, and CONTROLLER SPEED switch to MED.
6. After ZERO ENCODER condition lamp goes out, set Optics Mode switch to MANUAL. Drive SHAFT ANGLE CDU to 270.0°. Set CONTROLLER SPEED switch to LO.
7. Using the control stick, hold the SHAFT ANGLE CDU AT 270° and 2X TRUNNION CDU at 0°; adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident with the dot of Target No. 1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB GYRO COMPASSING TEST
JDC 10092 **REV** A **PAGE** 2 **OF** 5
SUBSYSTEM G & N SYSTEM
ASSY

8. Manipulate the SXT control stick until the center of the SXT vertical and horizontal reticle lines is approaching the central dot of Target No. 1. Press the MARK pushbutton at the instant of coincidence. Enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.
9. Set Optics Mode switch to ZERO OPTICS. When ZERO ENCODER lamp goes out, set Optics Mode switch to MANUAL and CONTROLLER SPEED switch to #1. Drive 2X TRUNNION and SHAFT ANGLE CDU's to 90.0° and 270.0°, respectively. Set CONTROLLER SPEED switch to LO.
10. Sight through SXT eyepiece and using control stick position the StLOS until the center of the SXT reticle is approaching the reticle dot of target #3.
11. Press MARK pushbutton at the instant of coincidence and enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.
12. The AGC now zeros the IMU CDU's, the ZERO ENCODER lamp shall light, and VERB 06, NOUN 66 will appear on G & N AGC DSKY VERB-NOUN display.

NOTE: If test is performed at MIT/IL-7 proceed to step 16.

13. Enter VERB 24 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.
14. Enter address 00763_8 into G & N AGC DSKY. Press ENTER pushbutton.
15. Enter LATITUDE 1 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.
16. Enter LATITUDE 2 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.
17. Enter VERB 33 into G & N AGC DSKY. Press ENTER pushbutton and record time.
18. After 1 minute, enter (and verify) VERB 06, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton and record the DSKY indications on R1 into 18c, R2 into 18a, and R3 into 18b on data sheet.
19. After recording angles, enter (and verify) VERB 36 in G & N AGC DSKY. Press ENTER pushbutton and ignore PROG ALARM lamp. Press ERROR RESET pushbutton.
20. Enter (and verify) VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.
21. Enter +27000 into G & N AGC DSKY. Press ENTER pushbutton.
22. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.
23. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.
24. Enter (and verify) VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.
25. Enter address 00760 into G & N AGC DSKY. Press ENTER pushbutton.

DATE ______

JOB GYRO COMPASSING TEST
JDC 10092 **REV** A **PAGE** 3 **OF** 5
SUBSYSTEM G & N SYSTEM
ASSY

26. Enter (and verify) ± Y Drift from (b) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton.
27. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton. Row 3 shall indicate 00761.
28. Enter (and verify) ± Z Drift from (c) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00762.
29. Enter (and verify) ± X Drift from (d) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00763.
30. Enter (and verify) LATITUDE 1 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00764.
31. Enter (and verify) LATITUDE 2 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00765.
32. Enter (and verify) +25000 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00766.
33. Enter (and verify) +00000 into G & N AGC DSKY. Press ENTER pushbutton.
34. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.
35. Enter (and verify) 02 into G & N AGC DSKY. Press ENTER pushbutton. Program display shall indicate 01.
36. Every 15 minutes for seven hours enter (and verify) VERB 06, NOUN 20 and press ENTER pushbutton. Record indications of R1, R2, and R3 and perform calculations if indicated on data sheet.
37. After five hours have been completed, monitor 28 VDC AGC on DVM by setting CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.
38. Adjust AGE VOLTAGE ADJUST knob on TEST CONTROL panel until the DVM indicates 25.8 volts dc.
39. Measure signals listed in column 1 of table 2 on the DVM by setting CROSSBAR CONTROL to positions indicated in column 2. Record indications on data sheet and continue to record DSKY indications every 15 minutes.

NOTE: When making dc measurements, place the PAVM VOLTMETER INPUT switch to OFF and the SCOPE "A" INPUT SIGNAL switch to OFF.

40. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.
41. After six hours have been completed, adjust AGE VOLTAGE ADJUST knob on the TEST CONTROL panel until the DVM indicates 30.8 volts dc.
42. Repeat step 39 and record indications.
43. Repeat step 40.
44. After seven hours have been completed, adjust AGE VOLTAGE ADJUST knob on the TEST CONTROL panel until the DVM indicates 27.5 (±0.25) volts dc. Record indications on data sheet.

DATE ______

JOB GYRO COMPASSING TEST
JDC 10092 **REV** A **PAGE** 4 **OF** 5
SUBSYSTEM G & N SYSTEM
ASSY

TEST LOCATION	LATITUDE 1	LATITUDE 2
ACSP	+ 11916	+ 45195
NAA	+ 09422	+ 81021
MSC	+ 08210	+ 14662
MILA	+ 01297	+ 79484

TABLE 1

45. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.
46. Enter (and verify) 00 into G & N AGC DSKY. Press ENTER pushbutton.
47. Set TRANSFER switch to MANUAL and press COARS ALIGN pushbutton on IMU CONTROL panel.
48. Enter VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.
49. Enter +00000 into G & N AGC DSKY three times, pressing ENTER pushbutton after each entry.
50. See JDC 10008, Section I or II for G & N System turn off.
51. Every time this JDC is performed, send a copy of all data sheets immediately to:

Inertial Subsystem Development Division
Mail Station #63
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Mass. - 02142

DATE ______

JOB GYRO COMPASSING TEST | **JDC** 10092 **REV** A **PAGE** 5 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

	1. SIGNAL	2 CROSSBAR CONTROL NO.	3 SIGNAL LOCATION
a.	28 volts dc AGC	193	56P9 pins 64 (high) and 63 (low)
b.	28 volts dc OPERATE/IMU	220	56P9 pins 49 (high) and 48 (low)
c.	28 volts dc OPTICS	200	56P9 pins 6 (high) and 5 (low)
d.	IMU 28 volts 1% 800 cps	121	56P9 pins 11 (high) and 12 (low)
e.	IMU 28 volts 5% 800 cps 0° PH A	122	56P9 pins 32 (high) and 50 (low)
f.	IMU 28 volts 5% 800 cps -90° PH A	222	56P9 pins 33 (high) and 50 (low)
g.	IMU 28 volts 5% 800 cps -90°	119	56P9 pins 13 (high) and 14 (low)
h.	OPTICS 28 volts 1% 800 cps	101	56P9 pins 125 (high) and 124 (low)
i.	OPTICS 28 volts 5% 800 cps -90°	201	56P9 pins 103 (high) and 102 (low)
j.	25.6 kcps IMU	223	56P9 pins 105 (high) and 87 (low)
k.	25.6 kcps OPTICS	102	56P9 pins 126 (high) and 104 (low)
l.	3.2 kcps 2 volts	123	56P9 pins 70 (high) and 88 (low)
m.	ELECTRONICS-28 volts dc (-27.5)	124	45A1J1 pins 33 (high) and 32 (low)
n.	AGC +3 volts dc	194	56P9 pins 46 (high) and 63 (low)
o.	AGC + 13 volts dc	293	56P9 pins 62 (high) and 63 (low)
p.	IMU 28 volts 1% 800 cps (SCS)	221	05A5P3 pins 243 (high) and 242 (low)
q.	+20 vdc cond.	157	56P9 pins 82 (high) and 83 (low)
r.	+2.5 vdc cond.	257	56P9 pins 81 (high) and 65 (low)

TABLE 2

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 13

JDC
NO. 10092
REV. A
INITIAL TDRR 21539

JOB GYRO COMPASSING TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ **DWG** ______ **REV.** ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ **SER. NO.** ______ ______ CAL DATE

NAME ______ **SER. NO.** ______ ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION **APPROVED BY** ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
18a	IG CDU (R2)	deg	▨	( )	▨	▨	▨
18b	MG CDU (R3)	deg	▨	( )	▨	▨	▨
18c	OG CDU (R1)	deg	▨	( )	▨	▨	▨
36-15	After 15 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-30	After 30 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-45	After 45 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ______ ( ) ______ ( )	▨	▨	▨

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 13

JDC
NO. 10092
REV A

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-60	After 60 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-75	After 75 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-90	After 90 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-105	After 105 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-120	After 120 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-120 c	Subtract line 36-120-R1 from line 18c	deg	-0.57	( ) ______ 18c ( ) ______ R1 ( ) ______	+0.57		

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 **OF** 13

JDC
NO. 10092
REV A

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-120 a	Subtract line 36-120-R2 from line 18a	deg	-0.03	( ) ______ 18a ( ) ______ R2 ( ) ______	+0.03		
36-120 b	Subtract line 36-120-R3 from line 18b	deg	-0.03	( ) ______ 18b ( ) ______ R3 ( ) ______	+0.03		
36-135	Subtract R1 (135) from R1 (120)	deg	-0.06	( ) ______ ( ) ______ ( ) ______	+0.06		
	Subtract R2 (135) from R2 (120)	deg	-0.01	( ) ______ ( ) ______ ( ) ______	+0.01		
	Subtract R3 (135) from R3 (120)	deg	-0.01	( ) ______ ( ) ______ ( ) ______	+0.01		
36-150	Subtract R1 (150) from R1 (120)	deg	-0.06	( ) ______ ( ) ______ ( ) ______	+0.06		
	Subtract R2 (150) from R2 (120)	deg	-0.01	( ) ______ ( ) ______ ( ) ______	+0.01		

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 **OF** 13

JDC
NO. 10092
REV. A

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-150 (cont)	Subtract R3 (150) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-165	Subtract R1 (165) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (165) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (165) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-180	Subtract R1 (180) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (180) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (180) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 13

JDC
NO. 10092
REV. A

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-195	Subtract R1 (195) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (195) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (195) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-210	Subtract R1 (210) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (210) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (210) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-225	Subtract R1 (225) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 13

JDC
NO. 10092
REV. A

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-225 (cont)	Subtract R2 (225) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (225) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-240	Subtract R1 (240) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (240) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (240) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-255	Subtract R1 (255) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (255) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 13

JDC
NO. 10092
REV. A

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-255 (cont)	Subtract R3 (255) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-270	Subtract R1 (270) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (270) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (270) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-285	Subtract R1 (285) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (285) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (285) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 13

JDC
NO. 10092
REV. A

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-300	Subtract R1 (300) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (300) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (300) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-315	After 315 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-330	After 330 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-345	After 345 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 13

JDC
NO. 10092
REV. A

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-360	After 360 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-375	After 375 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-390	After 390 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-405	After 405 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-420	After 420 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
39a	28 VDC AGC	vdc	▨		▨		
39b	28 VDC OPERATE/IMU	vdc	▨		▨		

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 13

JDC
NO. 10092
REV. A

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39c	28 VDC OPTICS	vdc	▨		▨		
39d	IMU 28 VAC, 1%	vac	27.44		28.56		
39e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
39f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
39i	OPTICS 28 VAC, 5%	vac	26.6		29.4		
39j	IMU 2.5 VAC	vac	2.25		2.75		
39k	OPTICS 2.5 VAC	vac	2.25		2.75		
39l	IMU 2 VAC, 1%	vac	1.926		2.004		
39m	-27.5 VDC **	vdc	-21.5		-33.5		
39n	AGC +3 VDC	vdc	2.5		3.5		

** Correct this measurement using "MULT BY" factor specified on drawing 1902141-003 or 1902141-004 to obtain the true value.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 13

JDC
NO. 10092
REV. A

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39o	AGC +13 VDC	vdc	12		14		
39p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
39q	+20 VDC cond.	vdc	18.45		22.55		
39r	+2.5 VDC cond.	vdc	2.25		2.75		
42a	28 VDC AGC	vdc	▨		▨		
42b	28 VDC OPERATE/IMU	vdc	▨		▨		
42c	28 VDC OPTICS	vdc	▨		▨		
42d	IMU 28 VAC, 1%	vac	27.44		28.56		
42e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
42f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
42i	OPTICS 28 VAC, 5%	vac	26.6		29.4		

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 13

JDC
NO. 10092
REV. A

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
42j	IMU 2.5 VAC	vac	2.25		2.75		
42k	OPTICS 2.5 VAC	vac	2.25		2.75		
42l	IMU 2 VAC, 1%	vac	1.926		2.004		
42m	-27.5 VDC **	vdc	-21.5		-33.5		
42n	AGC +3 VDC	vdc	2.5		3.5		
42o	AGC +13 VDC	vdc	12		14		
42p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
42q	+20 VDC cond.	vdc	18.45		22.55		
42r	+2.5 VDC cond.	vdc	2.25		2.75		
44	28 VDC AGC	vdc	27.25		27.75		
27 28 29 30 31 32 35	AGC Display		All Displays responded as required. (Record discrepancies in REMARKS portion of data sheet).				

REMARKS:

** Correct this measurement using "MULT BY" factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 **OF** 13

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(When Filled In)

JDC
NO. 10092
REV. A

JOB GYRO COMPASSING TEST

CALCULATION SHEET

(a) Obtain the following data from JDC 10093 or JDC's 15236, 15237, 15240, 15243 whichever is latest.

$ADIA_x$	(MERU)
NBD_x	(MERU)
NBD_y	(MERU)
NBD_z	(MERU)

Entries for drift compensation (five significant figures only)

(b) for step 26

$\pm$ Y Drift $= (NBD_y)\ (-.0060843) = (\quad)$. -----

(c) for step 28

$\pm$ Z Drift $= (NBD_z)\ (-.0060843) = (\quad)$. -----

(d) for step 29

$\pm$ X Drift $= \left[(ADIA_x) + (NBD_x)\right] (-.0060843) = (\quad)$. -----

CONFIDENTIAL
(When Filled In)

DATE ______

JDC 10092 REV. B PAGE 1 OF 5
JOB GYRO COMPASSING TEST INITIAL TDRR 21539 D.S. PGS 13
SUBSYSTEM G & N SYSTEM ASSY.

DESCRIPTION This test demonstrates the ability of the gyro stabilized platform (in conjunction with the Prelaunch Alignment program) to maintain a local vertical erection with Z SM pointing at an azimuth of 90°. The effects of high and low prime power variation on power supply outputs is also demonstrated.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-21-65	22665	1, 2	10, 12	WK	ACM
B	11-7-65	24596	3	-	WK	-

REFERENCES Paragraphs 3-3.1 and 3-3.7 of ATP 1026000.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. This JDC cannot be performed within one-hour of performing JDC 10008, 10033, 10086.

1. Insure that G & N Mounting Fixture is tilted to 0.0°.

2. Set TRANSFER switch on IMU CONTROL panel to COMPUTER.

3. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton.

4. Enter (and verify) VERB 71 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display will indicate 51 XX.

NOTE: If NOUN XX is written in procedure disregard Noun indication. Look only for requested indications on AGC DSKY including R1, R2 and R3.

5. Insure that TRACKER POWER switch is set to OFF, TRACKER pushbutton light off, CONTROLLER MODE switch to DIRECT, Optics Mode switch to ZERO OPTICS, and CONTROLLER SPEED switch to MED.

6. After ZERO ENCODER condition lamp goes out, set Optics Mode switch to MANUAL. Drive SHAFT ANGLE CDU to 270.0°. Set CONTROLLER SPEED switch to LO.

7. Using the control stick, hold the SHAFT ANGLE CDU AT 270° and 2X TRUNNION CDU at 0°; adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident with the dot of Target No. 1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 21 SEP 65

JOB GYRO COMPASSING TEST JDC 10092 REV B PAGE 2 OF 5
SUBSYSTEM G & N SYSTEM ASSY

8. Manipulate the SXT control stick until the center of the SXT vertical and horizontal reticle lines is approaching the central dot of Target No. 1. Press the MARK pushbutton at the instant of coincidence. Enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

9. Set Optics Mode switch to ZERO OPTICS. When ZERO ENCODER lamp goes out, set Optics Mode switch to MANUAL and CONTROLLER SPEED switch to #1. Drive 2X TRUNNION and SHAFT ANGLE CDU's to 90.0° and 270.0°, respectively. Set CONTROLLER SPEED switch to LO.

10. Sight through SXT eyepiece and using control stick position the SLOS until the center of the SXT reticle is approaching the reticle dot of target #3.

11. Press MARK pushbutton at the instant of coincidence and enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

12. The AGC now zeros the IMU CDU's, the ZERO ENCODER lamp shall light, and VERB 06, NOUN 66 will appear on G & N AGC DSKY VERB-NOUN display.

NOTE: If test is performed at MIT/IL-7 proceed to step 16.

13. Enter VERB 24 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

14. Enter address 00763_8 into G & N AGC DSKY. Press ENTER pushbutton.

15. Enter LATITUDE 1 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.

16. Enter LATITUDE 2 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter VERB 33 into G & N AGC DSKY. Press ENTER pushbutton and record time.

18. After 1 minute, enter (and verify) VERB 06, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton and record the DSKY indications on R1 into 18c, R2 into 18a, and R3 into 18b on data sheet.

19. After recording angles, enter (and verify) VERB 36 in G & N AGC DSKY. Press ENTER pushbutton and ignore PROG ALARM lamp. Press ERROR RESET pushbutton.

20. Enter (and verify) VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.

21. Enter +27000 into G & N AGC DSKY. Press ENTER pushbutton.

22. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.

23. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.

24. Enter (and verify) VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

25. Enter address 00760 into G & N AGC DSKY. Press ENTER pushbutton.

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JOB GYRO COMPASSING TEST JDC 10092 REV B PAGE 3 OF 5
SUBSYSTEM G & N SYSTEM ASSY

26. Enter (and verify) ± Y Drift from (b) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton.

27. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton. Row 3 shall indicate 00761.

28. Enter (and verify) ± Z Drift from (c) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00762.

29. Enter (and verify) ± X Drift from (d) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00763.

30. Enter (and verify) LATITUDE 1 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00764.

31. Enter (and verify) LATITUDE 2 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00765.

32. Enter (and verify) +25000 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00766.

33. Enter (and verify) +00000 into G & N AGC DSKY. Press ENTER pushbutton.

34. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.

35. Enter (and verify) 02 into G & N AGC DSKY. Press ENTER pushbutton. Program display shall indicate 01.

36. Every 15 minutes for seven hours enter (and verify) VERB 06, NOUN 20 and press ENTER pushbutton. Record indications of R1, R2, and R3 and perform calculations if indicated on data sheet.

37. After five hours have been completed, monitor 28 VDC AGC on DVM by setting CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.

38. Adjust AGE VOLTAGE ADJUST knob on TEST CONTROL panel until the DVM indicates 25.8 volts dc.

39. Measure signals listed in column 1 of table 2 on the DVM by setting CROSSBAR CONTROL to positions indicated in column 2. Record indications on data sheet and continue to record DSKY indications every 15 minutes.

NOTE: When making dc measurements, place the PAVM VOLTMETER INPUT switch to OFF and the SCOPE "A" INPUT SIGNAL switch to OFF.

40. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.

41. After six hours have been completed, adjust AGE VOLTAGE ADJUST knob on the TEST CONTROL panel until the DVM indicates 30.8 volts dc.

42. Repeat step 39 and record indications.

43. Repeat step 40.

44. After seven hours have been completed, adjust AGE VOLTAGE ADJUST knob on the

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JOB GYRO COMPASSING TEST JDC 10092 REV B PAGE 4 OF 5
SUBSYSTEM G & N SYSTEM ASSY

TEST LOCATION	LATITUDE 1	LATITUDE 2
ACSP	+ 11916	+ 45195
NAA	+ 09422	+ 81021
MSC	+ 08210	+ 14662
MILA	+ 01297	+ 79484

TABLE 1

TEST CONTROL panel until the DVM indicates 28.8 (±0.25) volts dc. Record indications on data sheet.

45. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.

46. Enter (and verify) 00 into G & N AGC DSKY. Press ENTER pushbutton.

47. Set TRANSFER switch to MANUAL and press COARS ALIGN pushbutton on IMU CONTROL panel.

48. Enter VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.

49. Enter +00000 into G & N AGC DSKY three times, pressing ENTER pushbutton after each entry.

50. See JDC 10008, Section I or II for G & N System turn off.

51. Every time this JDC is performed, send a copy of all data sheets immediately to:

Inertial Subsystem Development Division
Mail Station #63
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Mass. - 02142

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JOB GYRO COMPASSING TEST **JDC** 10092 **REV** B **PAGE** 5 **OF** 5

SUBSYSTEM G & · SYSTEM **ASSY**

1 SIGNAL		2 CROSSBAR CONTROL NO.	3 SIGNAL LOCATION
a.	28 volts dc AGC	193	56P9 pins 64 (high) and 63 (low)
b.	28 volts dc OPERATE/IMU	220	56P9 pins 49 (high) and 48 (low)
c.	28 volts dc OPTICS	200	56P9 pins 6 (high) and 5 (low)
d.	IMU 28 volts 1% 800 cps	121	56P9 pins 11 (high) and 12 (low)
e.	IMU 28 volts 5% 800 cps 0° PH A	122	56P9 pins 32 (high) and 50 (low)
f.	IMU 28 volts 5% 800 cps -90° PH A	222	56P9 pins 33 (high) and 50 (low)
g.	IMU 28 volts 5% 800 cps -90°	119	56P9 pins 13 (high) and 14 (low)
h.	OPTICS 28 volts 1% 800 cps	101	56P9 pins 125 (high) and 124 (low)
i.	OPTICS 28 volts 5% 800 cps -90°	201	56P9 pins 103 (high) and 102 (low)
j.	25.6 kcps IMU	223	56P9 pins 105 (high) and 87 (low)
k.	25.6 kcps OPTICS	102	56P9 pins 126 (high) and 104 (low)
l.	3.2 kcps 2 volts	123	56P9 pins 70 (high) and 88 (low)
m.	ELECTRONICS-28 volts dc (-27.5)	124	45A1J1 pins 33 (high) and 32 (low)
n.	AGC +3 volts dc	194	56P9 pins 46 (high) and 63 (low)
o.	AGC +13 volts dc	293	56P9 pins 62 (high) and 63 (low)
p.	IMU 28 volts 1% 800 cps (SCS)	221	05A5P3 pins 243 (high) and 242 (low)
q.	+20 vdc cond.	157	56P9 pins 82 (high) and 83 (low)
r.	+2.5 vdc cond.	257	56P9 pins 81 (high) and 65 (low)

TABLE 2

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 13

JDC
NO. 10092
REV. B
INITIAL TDRR 21539

JOB GYRO COMPASSING TEST

ASSEMBLY UNDER TEST

TITLE

SER. NO. DWG REV.

TEST HISTORY

DATE START END SITE / LOCATION

TIME START END TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME SER. NO. CAL DATE

NAME SER. NO. CAL DATE

CONDUCTED BY NAME/AFFILIATION APPROVED BY NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
18a	IG CDU (R2)	deg		( )			
18b	MG CDU (R3)	deg		( )			
18c	OG CDU (R1)	deg		( )			
36-15	After 15 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg		 ( ) ( ) ( )			
36-30	After 30 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg		 ( ) ( ) ( )			
36-45	After 45 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg		 ( ) ( ) ( )			

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 13

JDC
NO. 10092
REV. B

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-60	After 60 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg		 ( ) ( ) ( )			
36-75	After 75 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg		 ( ) ( ) ( )			
36-90	After 90 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg		 ( ) ( ) ( )			
36-105	After 105 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg		 ( ) ( ) ( )			
36-120	After 120 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg		 ( ) ( ) ( )			
36-120 c	Subtract line 36-120-R1 from line 18c	deg	-0.57	( ) 18c ( ) R1 ( )	+0.57		

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 **OF** 13

JDC
NO. 10092
REV. B

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-120 a	Subtract line 36-120-R2 from line 18a	deg	-0.03	( ) 18a ( ) R2 ( )	+0.03		
36-120 b	Subtract line 36-120-R3 from line 18b	deg	-0.03	( ) 18b ( ) R3 ( )	+0.03		
36-135	Subtract R1 (135) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (135) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (135) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-150	Subtract R1 (150) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (150) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 **OF** 13

JDC
NO. 10092
REV. B

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-150 (cont)	Subtract R3 (150) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-165	Subtract R1 (165) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (165) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (165) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-180	Subtract R1 (180) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (180) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (180) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 13

JDC
NO. 10092
REV. B

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-195	Subtract R1 (195) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (195) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (195) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-210	Subtract R1 (210) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (210) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (210) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-225	Subtract R1 (225) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 13

JDC
NO. 10092
REV. B

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-225 (cont)	Subtract R2 (225) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (225) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-240	Subtract R1 (240) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (240) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (240) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-255	Subtract R1 (255) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (255) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 13

JDC
NO. 10092
REV. B

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-255 (cont)	Subtract R3 (255) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-270	Subtract R1 (270) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (270) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (270) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-285	Subtract R1 (285) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (285) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (285) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 13

JDC
NO. 10092
REV. B

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-300	Subtract R1 (300) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (300) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (300) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-315	After 315 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-330	After 330 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-345	After 345 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 13

JDC
NO. 10092
REV. B

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-360	After 360 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-375	After 375 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-390	After 390 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-405	After 405 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-420	After 420 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
39a	28 VDC AGC	vdc	▨		▨		
39b	28 VDC OPERATE/IMU	vdc	▨		▨		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 13

JDC
NO. 10092
REV. B

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39c	28 VDC OPTICS	vdc	▨		▨		
39d	IMU 28 VAC, 1%	vac	27.44		28.56		
39e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
39f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
39i	OPTICS 28 VAC, 5%	vac	26.6		29.4		
39j	IMU 2.5 VAC	vac	2.25		2.75		
39k	OPTICS 2.5 VAC	vac	2.25		2.75		
39l	IMU 2 VAC, 1%	vac	1.926		2.004		
39m	-27.5 VDC **	vdc	-21.5		-33.5		
39n	AGC +3 VDC	vdc	2.5		3.5		

** Correct this measurement using "MULT BY" factor specified on drawing 1902141-003 or 1902141-004 to obtain the true value.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 13

JDC
NO. 10092
REV. B

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39o	AGC +13 VDC	vdc	12		14		
39p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
39q	+20 VDC cond.	vdc	18.45		22.55		
39r	+2.5 VDC cond.	vdc	2.25		2.75		
42a	28 VDC AGC	vdc	▨		▨		
42b	28 VDC OPERATE/IMU	vdc	▨		▨		
42c	28 VDC OPTICS	vdc	▨		▨		
42d	IMU 28 VAC, 1%	vac	27.44		28.56		
42e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
42f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
42i	OPTICS 28 VAC, 5%	vac	26.6		29.4		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 13

JDC
NO. 10092
REV. B

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
42j	IMU 2.5 VAC	vac	2.25		2.75		
42k	OPTICS 2.5 VAC	vac	2.25		2.75		
42l	IMU 2 VAC, 1%	vac	1.926		2.004		
42m	-27.5 VDC **	vdc	-21.5		-33.5		
42n	AGC +3 VDC	vdc	2.5		3.5		
42o	AGC +13 VDC	vdc	12		14		
42p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
42q	+20 VDC cond.	vdc	18.45		22.55		
42r	+2.5 VDC cond.	vdc	2.25		2.75		
44	28 VDC AGC	vdc	27.25		27.75		
27 28 29 30 31 32 35	AGC Display	All Displays responded as required. (Record discrepancies in REMARKS portion of data sheet).					

REMARKS:

** Correct this measurement using "MULT BY" factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 **OF** 13

CONFIDENTIAL
(When Filled In)

JDC
NO. 10092
REV. B

JOB GYRO COMPASSING TEST

CALCULATION SHEET

(a) Obtain the following data from JDC 10093 or JDC's 15236, 15237, 15240, 15243 whichever is latest.

$ADIA_x$	(MERU)
NBD_x	(MERU)
NBD_y	(MERU)
NBD_z	(MERU)

Entries for drift compensation (five significant figures only)

(b) for step 26

$\pm$ Y Drift = $(NBD_y)\ (-.0060843) = (\quad).$-----

(c) for step 28

$\pm$ Z Drift = $(NBD_z)\ (-.0060843) = (\quad).$-----

(d) for step 29

$\pm$ X Drift = $\left[(ADIA_x) + (NBD_x)\right](-.0060843) = (\quad).$-----

CONFIDENTIAL
(When Filled In)

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JOB GYRO COMPASSING TEST | **JDC** 10092 **REV.** C **PAGE** 1 **OF** 5
INITIAL TDRR 21539 **D.S. PGS** 13

SUBSYSTEM G & N SYSTEM | **ASSY.**

DESCRIPTION This test demonstrates the ability of the gyro stabilized platform (in conjunction with the Prelaunch Alignment program) to maintain a local vertical erection with Z SM pointing at an azimuth of 90°. The effects of high and low prime power variation on power supply outputs is also demonstrated.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-21-65	22665	1, 2	10, 12	WK	ACM
B	11-7-65	24596	3	-	WK	-
C	1-26-66	25625	-	12	WK	-

REFERENCES Paragraphs 3-3.1 and 3-3.7 of ATP 1026000.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. This JDC cannot be performed within one-hour of performing JDC 10008, 10033, 10086.

1. Insure that G & N Mounting Fixture is tilted to 0.0°.

2. Set TRANSFER switch on IMU CONTROL panel to COMPUTER.

3. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton.

4. Enter (and verify) VERB 71 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display will indicate 51 XX.

NOTE: If NOUN XX is written in procedure disregard Noun indication. Look only for requested indications on AGC DSKY including R1, R2 and R3.

5. Insure that TRACKER POWER switch is set to OFF, TRACKER pushbutton light off, CONTROLLER MODE switch to DIRECT, Optics Mode switch to ZERO OPTICS, and CONTROLLER SPEED switch to MED.

6. After ZERO ENCODER condition lamp goes out, set Optics Mode switch to MANUAL. Drive SHAFT ANGLE CDU to 270.0°. Set CONTROLLER SPEED switch to LO.

7. Using the control stick, hold the SHAFT ANGLE CDU AT 270° and 2X TRUNNION CDU at 0°; adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident with the dot of Target No. 1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 21 SEP 65

JOB GYRO COMPASSING TEST | **JDC** 10092 **REV** C **PAGE** 2 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

8. Manipulate the SXT control stick until the center of the SXT vertical and horizontal reticle lines is approaching the central dot of Target No. 1. Press the MARK pushbutton at the instant of coincidence. Enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

9. Set Optics Mode switch to ZERO OPTICS. When ZERO ENCODER lamp goes out, set Optics Mode switch to MANUAL and CONTROLLER SPEED switch to #1. Drive 2X TRUNNION and SHAFT ANGLE CDU's to 90.0° and 270.0°, respectively. Set CONTROLLER SPEED switch to LO.

10. Sight through SXT eyepiece and using control stick position the SLOS until the center of the SXT reticle is approaching the reticle dot of target #3.

11. Press MARK pushbutton at the instant of coincidence and enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

12. The AGC now zeros the IMU CDU's, the ZERO ENCODER lamp shall light, and VERB 06, NOUN 66 will appear on G & N AGC DSKY VERB-NOUN display.

NOTE: If test is performed at MIT/IL-7 proceed to step 16.

13. Enter VERB 24 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

14. Enter address 00763_8 into G & N AGC DSKY. Press ENTER pushbutton.

15. Enter LATITUDE 1 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.

16. Enter LATITUDE 2 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter VERB 33 into G & N AGC DSKY. Press ENTER pushbutton and record time.

18. After 1 minute, enter (and verify) VERB 06, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton and record the DSKY indications on R1 into 18c, R2 into 18a, and R3 into 18b on data sheet.

19. After recording angles, enter (and verify) VERB 36 in G & N AGC DSKY. Press ENTER pushbutton and ignore PROG ALARM lamp. Press ERROR RESET pushbutton.

20. Enter (and verify) VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.

21. Enter +27000 into G & N AGC DSKY. Press ENTER pushbutton.

22. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.

23. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.

24. Enter (and verify) VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

25. Enter address 00760 into G & N AGC DSKY. Press ENTER pushbutton.

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JOB GYRO COMPASSING TEST | **JDC** 10092 **REV** C **PAGE** 3 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

26. Enter (and verify) ± Y Drift from (b) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton.

27. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton. Row 3 shall indicate 00761.

28. Enter (and verify) ± Z Drift from (c) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00762.

29. Enter (and verify) ± X Drift from (d) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00763.

30. Enter (and verify) LATITUDE 1 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00764.

31. Enter (and verify) LATITUDE 2 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00765.

32. Enter (and verify) +25000 into G & N AGC DSKY. Press ENTER pushbutton wice. Row 3 shall indicate 00766.

33. Enter (and verify) +00000 into G & N AGC DSKY. Press ENTER pushbutton.

34. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.

35. Enter (and verify) 02 into G & N AGC DSKY. Press ENTER pushbutton. Program display shall indicate 01.

36. Every 15 minutes for seven hours enter (and verify) VERB 06, NOUN 20 and press ENTER pushbutton. Record indications of R1, R2, and R3 and perform calculations if indicated on data sheet.

37. After five hours have been completed, monitor 28 VDC AGC on DVM by setting CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.

38. Adjust AGE VOLTAGE ADJUST knob on TEST CONTROL panel until the DVM indicates 25.8 volts dc.

39. Measure signals listed in column 1 of table 2 on the DVM by setting CROSSBAR CONTROL to positions indicated in column 2. Record indications on data sheet and continue to record DSKY indications every 15 minutes.

NOTE: When making dc measurements, place the PAVM VOLTMETER INPUT switch to OFF and the SCOPE "A" INPUT SIGNAL switch to OFF.

40. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.

41. After six hours have been completed, adjust AGE VOLTAGE ADJUST knob on the TEST CONTROL panel until the DVM indicates 30.8 volts dc.

42. Repeat step 39 and record indications.

43. Repeat step 40.

44. After seven hours have been completed, adjust AGE VOLTAGE ADJUST knob on the TEST CONTROL panel until the DVM indicates 28.8 (±0.25) volts dc. Record indications on data sheet.

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JOB GYRO COMPASSING TEST | **JDC** 10092 **REV** C **PAGE** 4 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

TEST LOCATION	LATITUDE 1	LATITUDE 2
ACSP	+ 11916	+ 45195
NAA	+ 09422	+ 81021
MSC	+ 08210	+ 14662
MILA	+ 01297	+ 79484

TABLE 1

45. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.

46. Enter (and verify) 00 into G & N AGC DSKY. Press ENTER pushbutton.

47. Set TRANSFER switch to MANUAL and press COARS ALIGN pushbutton on IMU CONTROL panel.

48. Enter VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.

49. Enter +00000 into G & N AGC DSKY three times, pressing ENTER pushbutton after each entry.

50. See JDC 10008, Section I or II for G & N System turn off.

51. Every time this JDC is performed, send a copy of all data sheets immediately to:

Inertial Subsystem Development Division
Mail Station #63
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Mass. - 02142

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JOB GYRO COMPASSING TEST | **JDC** 10092 **REV** C **PAGE** 5 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

	1 SIGNAL	2 CROSSBAR CONTROL NO.	3 SIGNAL LOCATION
a.	28 volts dc AGC	193	56P9 pins 64 (high) and 63 (low)
b.	28 volts dc OPER-ATE/IMU	220	56P9 pins 49 (high) and 48 (low)
c.	28 volts dc OPTICS	200	56P9 pins 6 (high) and 5 (low)
d.	IMU 28 volts 1% 800 cps	121	56P9 pins 11 (high) and 12 (low)
e.	IMU 28 volts 5% 800 cps 0° PH A	122	56P9 pins 32 (high) and 50 (low)
f.	IMU 28 volts 5% 800 cps -90° PH A	222	56P9 pins 33 (high) and 50 (low)
g.	IMU 28 volts 5% 800 cps -90°	119	56P9 pins 13 (high) and 14 (low)
h.	OPTICS 28 volts 1% 800 cps	101	56P9 pins 125 (high) and 124 (low)
i.	OPTICS 28 volts 5% 800 cps -90°	201	56P9 pins 103 (high) and 102 (low)
j.	25.6 kcps IMU	223	56P9 pins 105 (high) and 87 (low)
k.	25.6 kcps OPTICS	102	56P9 pins 126 (high) and 104 (low)
l.	3.2 kcps 2 volts	123	56P9 pins 70 (high) and 88 (low)
m.	ELECTRONICS-28 volts dc (-27.5)	124	45A1J1 pins 33 (high) and 32 (low)
n.	AGC +3 volts dc	194	56P9 pins 46 (high) and 63 (low)
o.	AGC +13 volts dc	293	56P9 pins 62 (high) and 63 (low)
p.	IMU 28 volts 1% 800 cps (SCS)	221	05A5P3 pins 243 (high) and 242 (low)
q.	+20 vdc cond.	157	56P9 pins 82 (high) and 83 (low)
r.	+2.5 vdc cond.	257	56P9 pins 81 (high) and 65 (low)

TABLE 2

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 13
JOB GYRO COMPASSING TEST

JDC
NO. 10092
REV. C
INITIAL TDRR 21539

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ **DWG** ____ **REV.** ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ **SER. NO.** ____ CAL DATE
NAME ____ **SER. NO.** ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION **APPROVED BY** ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
18a	IG CDU (R2)	deg	▨	( )	▨	▨	▨
18b	MG CDU (R3)	deg	▨	( )	▨	▨	▨
18c	OG CDU (R1)	deg	▨	( )	▨	▨	▨
36-15	After 15 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-30	After 30 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-45	After 45 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 13
JOB GYRO COMPASSING TEST

JDC
NO. 10092
REV C

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-60	After 60 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-75	After 75 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-90	After 90 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-105	After 105 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-120	After 120 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-120 c	Subtract line 36-120-R1 from line 18c	deg	-0.57	( ) 18c ( ) R1 ( )	+0.57		

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 **OF** 13
JOB GYRO COMPASSING TEST

JDC
NO. 10092
REV C

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-120 a	Subtract line 36-120-R2 from line 18a	deg	-0.03	( ) 18a ( ) R2 ( )	+0.03		
36-120 b	Subtract line 36-120-R3 from line 18b	deg	-0.03	( ) 18b ( ) R3 ( )	+0.03		
36-135	Subtract R1 (135) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (135) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (135) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-150	Subtract R1 (150) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (150) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 **OF** 13

JDC
NO. 10092
REV. C

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-150 (cont)	Subtract R3 (150) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-165	Subtract R1 (165) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (165) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (165) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-180	Subtract R1 (180) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (180) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (180) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 13

JDC
NO. 10092
REV. C

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-195	Subtract R1 (195) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (195) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (195) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-210	Subtract R1 (210) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (210) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (210) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-225	Subtract R1 (225) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 13

JDC
NO. 10092
REV. C

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-225 (cont)	Subtract R2 (225) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (225) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-240	Subtract R1 (240) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (240) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (240) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-255	Subtract R1 (255) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (255) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 13

JDC
NO. 10092
REV. C

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-255 (cont)	Subtract R3 (255) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-270	Subtract R1 (270) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (270) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (270) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-285	Subtract R1 (285) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (285) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (285) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 13

JDC
NO. 10092
REV. C

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-300	Subtract R1 (300) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (300) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (300) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-315	After 315 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-330	After 330 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-345	After 345 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 13

JDC
NO. 10092
REV. C

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-360	After 360 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-375	After 375 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-390	After 390 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-405	After 405 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-420	After 420 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
39a	28 VDC AGC	vdc	▨		▨		
39b	28 VDC OPERATE/IMU	vdc	▨		▨		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 13

JDC
NO. 10092
REV. C

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39c	28 VDC OPTICS	vdc	▨		▨		
39d	IMU 28 VAC, 1%	vac	27.44		28.56		
39e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
39f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
39i	OPTICS 28 VAC, 5%	vac	26.6		29.4		
39j	IMU 2.5 VAC	vac	2.25		2.75		
39k	OPTICS 2.5 VAC	vac	2.25		2.75		
39l	IMU 2 VAC, 1%	vac	1.926		2.004		
39m	-27.5 VDC **	vdc	-21.5		-33.5		
39n	AGC +3 VDC	vdc	2.5		3.5		

** Correct this measurement using "MULT BY" factor specified on drawing 1902141-003 or 1902141-004 to obtain the true value.

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EQUIPMENT TEST
DATA SHEET 11 **OF** 13

JDC
NO. 10092
REV. C

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39o	AGC +13 VDC	vdc	12		14		
39p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
39q	+20 VDC cond.	vdc	18.45		22.55		
39r	+2.5 VDC cond.	vdc	2.25		2.75		
42a	28 VDC AGC	vdc	▨		▨		
42b	28 VDC OPERATE/IMU	vdc	▨		▨		
42c	28 VDC OPTICS	vdc	▨		▨		
42d	IMU 28 VAC, 1%	vac	27.44		28.56		
42e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
42f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
42i	OPTICS 28 VAC, 5%	vac	26.6		29.4		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 13

JDC
NO. 10092
REV. C

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
42j	IMU 2.5 VAC	vac	2.25		2.75		
42k	OPTICS 2.5 VAC	vac	2.25		2.75		
42l	IMU 2 VAC, 1%	vac	1.926		2.004		
42m	-27.5 VDC **	vdc	-21.5		-33.5		
42n	AGC +3 VDC	vdc	2.5		3.5		
42o	AGC +13 VDC	vdc	12		14		
42p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
42q	+20 VDC cond.	vdc	18.45		22.55		
42r	+2.5 VDC cond.	vdc	2.25		2.75		
44	28 VDC AGC	vdc	28.55		29.05		
27 28 29 30 31 32 35	AGC Display	All Displays responded as required. (Record discrepancies in REMARKS portion of data sheet).					

REMARKS:

** Correct this measurement using "MULT BY" factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 **OF** 13

CONFIDENTIAL
(When Filled In)

JDC
NO. 10092
REV. C

JOB GYRO COMPASSING TEST

CALCULATION SHEET

(a) Obtain the following data from JDC 10093 or JDC's 15236, 15237, 15240, 15243 whichever is latest.

$ADIA_x$ (MERU)

NBD_x (MERU)

NBD_y (MERU)

NBD_z (MERU)

Entries for drift compensation (five significant figures only)

(b) for step 26

$\pm$ Y Drift $= (NBD_y)\ (-.0060843) = (\quad).\_\_\_\_\_$

(c) for step 28

$\pm$ Z Drift $= (NBD_z)\ (-.0060843) = (\quad).\_\_\_\_\_$

(d) for step 29

$\pm$ X Drift $= \left[(ADIA_x) + (NBD_x)\right](-.0060843) = (\quad).\_\_\_\_\_$

CONFIDENTIAL
(When Filled In)

DATE 21 SEP 65

JOB GYRO COMPASSING TEST | **JDC** 10092 **REV.** D **PAGE** 1 **OF** 5
INITIAL TDRR 21539 **D.S. PGS** 13

SUBSYSTEM G & N SYSTEM | **ASSY.**

DESCRIPTION This test demonstrates the ability of the gyro stabilized platform (in conjunction with the Prelaunch Alignment program) to maintain a local vertical erection with Z SM pointing at an azimuth of 90°. The effects of high and low prime power variation on power supply outputs is also demonstrated.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-21-65	22665	1, 2	10, 12	WK	ACM
B	11-7-65	24596	3	-	WK	-
C	1-26-66	25625	-	12	WK	-
D	5-6-66	28588	2	10, 12	MM	ACM

REFERENCES Paragraphs 3-3.1 and 3-3.7 of ATP 1026000.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. This JDC cannot be performed within one-hour of performing JDC 10008, 10033, 10086.

1. Insure that G & N Mounting Fixture is tilted to 0.0°.

2. Set TRANSFER switch on IMU CONTROL panel to COMPUTER.

3. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton.

4. Enter (and verify) VERB 71 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display will indicate 51 XX.

NOTE: If NOUN XX is written in procedure disregard Noun indication. Look only for requested indications on AGC DSKY including R1, R2 and R3.

5. Insure that TRACKER POWER switch is set to OFF, TRACKER pushbutton light off, CONTROLLER MODE switch to DIRECT, Optics Mode switch to ZERO OPTICS, and CONTROLLER SPEED switch to MED.

6. After ZERO ENCODER condition lamp goes out, set Optics Mode switch to MANUAL. Drive SHAFT ANGLE CDU to 270.0°. Set CONTROLLER SPEED switch to LO.

7. Using the control stick, hold the SHAFT ANGLE CDU AT 270° and 2X TRUNNION CDU at 0°; adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident with the dot of Target No. 1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 21 SEP 65

JOB GYRO COMPASSING TEST | **JDC** 10092 **REV** D **PAGE** 2 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

8. Manipulate the SXT control stick until the center of the SXT vertical and horizontal reticle lines is approaching the central dot of Target No. 1. Press the MARK pushbutton at the instant of coincidence. Enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

9. Set Optics Mode switch to ZERO OPTICS. When ZERO ENCODER lamp goes out, set Optics Mode switch to MANUAL and CONTROLLER SPEED switch to HI. Drive 2X TRUNNION and SHAFT ANGLE CDU's to 90.0° and 270.0°, respectively. Set CONTROLLER SPEED switch to LO.

10. Sight through SXT eyepiece and using control stick position the StLOS until the center of the SXT reticle is approaching the reticle dot of target #3.

11. Press MARK pushbutton at the instant of coincidence and enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

12. The AGC now zeros the IMU CDU's, the ZERO ENCODER lamp shall light, and VERB 06, NOUN 66 will appear on G & N AGC DSKY VERB-NOUN display.

NOTE: If test is performed at MIT/IL-7 proceed to step 16.

13. Enter VERB 24 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

14. Enter address 00763_8 into G & N AGC DSKY. Press ENTER pushbutton.

15. Enter LATITUDE 1 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.

16. Enter LATITUDE 2 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter VERB 33 into G & N AGC DSKY. Press ENTER pushbutton and record time.

18. After 1 minute, enter (and verify) VERB 06, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton and record the DSKY indications on R1 into 18c, R2 into 18a, and R3 into 18b on data sheet.

19. After recording angles, enter (and verify) VERB 36 in G & N AGC DSKY. Press ENTER pushbutton and ignore PROG ALARM lamp. Press ERROR RESET pushbutton.

20. Enter (and verify) VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.

21. Enter +27000 into G & N AGC DSKY. Press ENTER pushbutton.

22. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.

23. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.

24. Enter (and verify) VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

25. Enter address 00760 into G & N AGC DSKY. Press ENTER pushbutton.

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JOB GYRO COMPASSING TEST | **JDC** 10092 **REV** D **PAGE** 3 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

26. Enter (and verify) ± Y Drift from (b) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton.

27. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton. Row 3 shall indicate 00761.

28. Enter (and verify) ± Z Drift from (c) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00762.

29. Enter (and verify) ± X Drift from (d) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00763.

30. Enter (and verify) LATITUDE 1 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00764.

31. Enter (and verify) LATITUDE 2 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00765.

32. Enter (and verify) +25000 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00766.

33. Enter (and verify) +00000 into G & N AGC DSKY. Press ENTER pushbutton.

34. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.

35. Enter (and verify) 02 into G & N AGC DSKY. Press ENTER pushbutton. Program display shall indicate 01.

36. Every 15 minutes for seven hours enter (and verify) VERB 06, NOUN 20 and press ENTER pushbutton. Record indications of R1, R2, and R3 and perform calculations if indicated on data sheet.

37. After five hours have been completed, monitor 28 VDC AGC on DVM by setting CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.

38. Adjust AGE VOLTAGE ADJUST knob on TEST CONTROL panel until the DVM indicates 25.8 volts dc.

39. Measure signals listed in column 1 of table 2 on the DVM by setting CROSSBAR CONTROL to positions indicated in column 2. Record indications on data sheet and continue to record DSKY indications every 15 minutes.

NOTE: When making dc measurements, place the PAVM VOLTMETER INPUT switch to OFF and the SCOPE "A" INPUT SIGNAL switch to OFF.

40. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.

41. After six hours have been completed, adjust AGE VOLTAGE ADJUST knob on the TEST CONTROL panel until the DVM indicates 30.8 volts dc.

42. Repeat step 39 and record indications.

43. Repeat step 40.

44. After seven hours have been completed, adjust AGE VOLTAGE ADJUST knob on the

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JOB GYRO COMPASSING TEST | **JDC** 10092 **REV** D **PAGE** 4 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

TEST LOCATION	LATITUDE 1	LATITUDE 2
ACSP	+ 11916	+ 45195
NAA	+ 09422	+ 81021
MSC	+ 08210	+ 14662
MILA	+ 01297	+ 79484

TABLE 1

TEST CONTROL panel until the DVM indicates 28.8 (±0.25) volts dc. Record indications on data sheet.

45. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.

46. Enter (and verify) 00 into G & N AGC DSKY. Press ENTER pushbutton.

47. Set TRANSFER switch to MANUAL and press COARS ALIGN pushbutton on IMU CONTROL panel.

48. Enter VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.

49. Enter +00000 into G & N AGC DSKY three times, pressing ENTER pushbutton after each entry.

50. See JDC 10008, Section I or II for G & N System turn off.

51. Every time this JDC is performed, send a copy of all data sheets immediately to:

Inertial Subsystem Development Division
Mail Station #63
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Mass. - 02142

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JOB GYRO COMPASSING TEST | **JDC** 10092 **REV** D **PAGE** 5 **OF** 5

SUBSYSTEM G & N SYSTEM | **ASSY**

	1 SIGNAL	2 CROSSBAR CONTROL NO.	3 SIGNAL LOCATION
a.	28 volts dc AGC	193	56P9 pins 64 (high) and 63 (low)
b.	28 volts dc OPERATE/IMU	220	56P9 pins 49 (high) and 48 (low)
c.	28 volts dc OPTICS	200	56P9 pins 6 (high) and 5 (low)
d.	IMU 28 volts 1% 800 cps	121	56P9 pins 11 (high) and 12 (low)
e.	IMU 28 volts 5% 800 cps 0° PH A	122	56P9 pins 32 (high) and 50 (low)
f.	IMU 28 volts 5% 800 cps -90° PH A	222	56P9 pins 33 (high) and 50 (low)
g.	IMU 28 volts 5% 800 cps -90°	119	56P9 pins 13 (high) and 14 (low)
h.	OPTICS 28 volts 1% 800 cps	101	56P9 pins 125 (high) and 124 (low)
i.	OPTICS 28 volts 5% 800 cps -90°	201	56P9 pins 103 (high) and 102 (low)
j.	25.6 kcps IMU	223	56P9 pins 105 (high) and 87 (low)
k.	25.6 kcps OPTICS	102	56P9 pins 126 (high) and 104 (low)
l.	3.2 kcps 2 volts	123	56P9 pins 70 (high) and 88 (low)
m.	ELECTRONICS-28 volts dc (-27.5)	124	45A1J1 pins 33 (high) and 32 (low)
n.	AGC +3 volts dc	194	56P9 pins 46 (high) and 63 (low)
o.	AGC +13 volts dc	293	56P9 pins 62 (high) and 63 (low)
p.	IMU 28 volts 1% 800 cps (SCS)	221	05A5P3 pins 243 (high) and 242 (low)
q.	+20 vdc cond.	157	56P9 pins 82 (high) and 83 (low)
r.	+2.5 vdc cond.	257	56P9 pins 81 (high) and 65 (low)

TABLE 2

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 13
JOB GYRO COMPASSING TEST

JDC
NO. 10092
REV. D
INITIAL TDRR 21539

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ **DWG** ______ **REV.** ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ **SER. NO.** ______ CAL DATE
NAME ______ **SER. NO.** ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION **APPROVED BY** ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
18a	IG CDU (R2)	deg	▨	( )	▨	▨	▨
18b	MG CDU (R3)	deg	▨	( )	▨	▨	▨
18c	OG CDU (R1)	deg	▨	( )	▨	▨	▨
36-15	After 15 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-30	After 30 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-45	After 45 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 13
JOB GYRO COMPASSING TEST

JDC
NO. 10092
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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-60	After 60 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-75	After 75 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-90	After 90 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-105	After 105 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-120	After 120 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-120 c	Subtract line 36-120-R1 from line 18c	deg	-0.57	( ) 18c ( ) R1 ( )	+0.57		

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 **OF** 13
JOB GYRO COMPASSING TEST

JDC
NO. 10092
REV. D

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-120 a	Subtract line 36-120-R2 from line 18a	deg	-0.03	( ) 18a ( ) R2 ( )	+0.03		
36-120 b	Subtract line 36-120-R3 from line 18b	deg	-0.03	( ) 18b ( ) R3 ( )	+0.03		
36-135	Subtract R1 (135) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (135) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (135) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-150	Subtract R1 (150) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (150) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 **OF** 13

JDC
NO. 10092
REV. D

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-150 (cont)	Subtract R3 (150) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-165	Subtract R1 (165) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (165) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (165) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-180	Subtract R1 (180) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (180) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (180) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 13

JDC
NO. 10092
REV D

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-195	Subtract R1 (195) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (195) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (195) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-210	Subtract R1 (210) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (210) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (210) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-225	Subtract R1 (225) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		

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EQUIPMENT TEST
DATA SHEET 6 **OF** 13

JDC
NO. 10092
REV. D

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-225 (cont)	Subtract R2 (225) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (225) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-240	Subtract R1 (240) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (240) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (240) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-255	Subtract R1 (255) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (255) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 13

JDC
NO. 10092
REV. D

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-255 (cont)	Subtract R3 (255) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-270	Subtract R1 (270) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (270) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (270) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-285	Subtract R1 (285) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (285) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (285) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 13

JDC
NO. 10092
REV. D

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-300	Subtract R1 (300) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (300) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (300) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-315	After 315 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-330	After 330 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-345	After 345 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 13

JDC
NO. 10092
REV. D

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-360	After 360 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-375	After 375 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-390	After 390 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-405	After 405 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-420	After 420 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
39a	28 VDC AGC	vdc	▨		▨		
39b	28 VDC OPERATE/IMU	vdc	▨		▨		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 13

JDC
NO. 10092
REV. D

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39c	28 VDC OPTICS	vdc	▨		▨		
39d	IMU 28 VAC, 1%	vac	27.44		28.56		
39e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
39f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
39i	OPTICS 28 VAC, 5%	vac	26.6		29.4		
39j	IMU 2.5 VAC	vac	2.25		2.75		
39k	OPTICS 2.5 VAC	vac	2.25		2.75		
39l	IMU 2 VAC, 1%	vac	1.926		2.004		
39m	-27.5 VDC **	vdc	-21.5		-33.5		
39n	AGC +3 VDC	vdc	2.5		3.5		

** Correct this measurement using "MULT BY" factor to obtain the true value.

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EQUIPMENT TEST
DATA SHEET 11 **OF** 13

JDC
NO. 10092
REV. D

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39o	AGC +13 VDC	vdc	12		14		
39p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
39q	+20 VDC cond.	vdc	18.45		22.55		
39r	+2.5 VDC cond.	vdc	2.25		2.75		
42a	28 VDC AGC	vdc	▨		▨		
42b	28 VDC OPERATE/IMU	vdc	▨		▨		
42c	28 VDC OPTICS	vdc	▨		▨		
42d	IMU 28 VAC, 1%	vac	27.44		28.56		
42e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
42f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
42i	OPTICS 28 VAC, 5%	vac	26.6		29.4		

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EQUIPMENT TEST
DATA SHEET 12 **OF** 13

JDC
NO. 10092
REV. D

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
42j	IMU 2.5 VAC	vac	2.25		2.75		
42k	OPTICS 2.5 VAC	vac	2.25		2.75		
42l	IMU 2 VAC, 1%	vac	1.926		2.004		
42m	-27.5 VDC **	vdc	-21.5		-33.5		
42n	AGC +3 VDC	vdc	2.5		3.5		
42o	AGC +13 VDC	vdc	12		14		
42p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
42q	+20 VDC cond.	vdc	18.45		22.55		
42r	+2.5 VDC cond.	vdc	2.25		2.75		
44	28 VDC AGC	vdc	28.55		29.05		
27 28 29 30 31 32 35	AGC Display	All Displays responded as required. (Record discrepancies in REMARKS portion of data sheet).					

REMARKS:

** Correct this measurement using "MULT BY" factor to obtain the true value.

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JDC
NO. 10092
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JOB GYRO COMPASSING TEST

CALCULATION SHEET

(a) Obtain the following data from JDC 10093 or JDC's 15236, 15237, 15240, 15243 whichever is latest.

$ADIA_x$	(MERU)
NBD_x	(MERU)
NBD_y	(MERU)
NBD_z	(MERU)

Entries for drift compensation (five significant figures only)

(b) for step 26

$$\pm \text{ Y Drift} = (NBD_y)\ (-.0060843) = (\quad).\text{-----}$$

(c) for step 28

$$\pm \text{ Z Drift} = (NBD_z)\ (-.0060843) = (\quad).\text{-----}$$

(d) for step 29

$$\pm \text{ X Drift} = \left[(ADIA_x) + (NBD_x)\right](-.0060843) = (\quad).\text{-----}$$

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JOB GYRO COMPASSING TEST

JDC 10092 **REV.** E **PAGE** 1 **OF** 5
INITIAL TDRR 21539 **D.S. PGS** 13

SUBSYSTEM G & N SYSTEM

ASSY.

DESCRIPTION This test demonstrates the ability of the gyro stabilized platform (in conjunction with the Prelaunch Alignment program) to maintain a local vertical erection with Z SM pointing at an azimuth of 90°. The effects of high and low prime power variation on power supply outputs is also demonstrated.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-21-65	22665	1, 2	10, 12	WK	ACM
B	11-7-65	24596	3	-	WK	-
C	1-26-66	25625	-	12	WK	-
D	5-6-66	28588	2	10, 12	MM	ACM
E	7-28-66	30317	1	-	EA	WS

REFERENCES Paragraphs 3-3.1 and 3-3.7 of ATP 1026000.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. This JDC cannot be performed within one-hour of performing JDC 10008, 10033, 10086.

3. With AGC/PSA/SC Harness P/N 1004866 make the following substitutions: Page 5, table 2, step n. 293 for 194 and in step o. 194 for 293.

1. Insure that G & N Mounting Fixture is tilted to 0.0°.

2. Set TRANSFER switch on IMU CONTROL panel to COMPUTER.

3. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton.

4. Enter (and verify) VERB 71 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display will indicate 51 XX.

NOTE: If NOUN XX is written in procedure disregard Noun indication. Look only for requested indications on AGC DSKY including R1, R2 and R3.

5. Insure that TRACKER POWER switch is set to OFF, TRACKER pushbutton light off, CONTROLLER MODE switch to DIRECT, Optics Mode switch to ZERO OPTICS, and CONTROLLER SPEED switch to MED.

6. After ZERO ENCODER condition lamp goes out, set Optics Mode switch to MANUAL. Drive SHAFT ANGLE CDU to 270.0°. Set CONTROLLER SPEED switch to LO.

7. Using the control stick, hold the SHAFT ANGLE CDU AT 270° and 2X TRUNNION CDU at 0°; adjust the G & N Mounting Fixture until the horizontal reticle line of the SXT is coincident with the dot of Target No. 1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 21 SEP 65

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8. Manipulate the SXT control stick until the center of the SXT vertical and horizontal reticle lines is approaching the central dot of Target No. 1. Press the MARK pushbutton at the instant of coincidence. Enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

9. Set Optics Mode switch to ZERO OPTICS. When ZERO ENCODER lamp goes out, set Optics Mode switch to MANUAL and CONTROLLER SPEED switch to HI. Drive 2X TRUNNION and SHAFT ANGLE CDU's to 90.0° and 270.0°, respectively. Set CONTROLLER SPEED switch to LO.

10. Sight through SXT eyepiece and using control stick position the StLOS until the center of the SXT reticle is approaching the reticle dot of target #3.

11. Press MARK pushbutton at the instant of coincidence and enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

12. The AGC now zeros the IMU CDU's, the ZERO ENCODER lamp shall light, and VERB 06, NOUN 66 will appear on G & N AGC DSKY VERB-NOUN display.

NOTE: If test is performed at MIT/IL-7 proceed to step 16.

13. Enter VERB 24 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

14. Enter address 00763_8 into G & N AGC DSKY. Press ENTER pushbutton.

15. Enter LATITUDE 1 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.

16. Enter LATITUDE 2 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter VERB 33 into G & N AGC DSKY. Press ENTER pushbutton and record time.

18. After 1 minute, enter (and verify) VERB 06, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton and record the DSKY indications on R1 into 18c, R2 into 18a, and R3 into 18b on data sheet.

19. After recording angles, enter (and verify) VERB 36 in G & N AGC DSKY. Press ENTER pushbutton and ignore PROG ALARM lamp. Press ERROR RESET pushbutton.

20. Enter (and verify) VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.

21. Enter +27000 into G & N AGC DSKY. Press ENTER pushbutton.

22. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.

23. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.

24. Enter (and verify) VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

25. Enter address 00760 into G & N AGC DSKY. Press ENTER pushbutton.

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26. Enter (and verify) ± Y Drift from (b) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton.

27. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton. Row 3 shall indicate 00761.

28. Enter (and verify) ± Z Drift from (c) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00762.

29. Enter (and verify) ± X Drift from (d) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00763.

30. Enter (and verify) LATITUDE 1 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00764.

31. Enter (and verify) LATITUDE 2 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00765.

32. Enter (and verify) +25000 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00766.

33. Enter (and verify) +00000 into G & N AGC DSKY. Press ENTER pushbutton.

34. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.

35. Enter (and verify) 02 into G & N AGC DSKY. Press ENTER pushbutton. Program display shall indicate 01.

36. Every 15 minutes for seven hours enter (and verify) VERB 06, NOUN 20 and press ENTER pushbutton. Record indications of R1, R2, and R3 and perform calculations if indicated on data sheet.

37. After five hours have been completed, monitor 28 VDC AGC on DVM by setting CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.

38. Adjust AGE VOLTAGE ADJUST knob on TEST CONTROL panel until the DVM indicates 25.8 volts dc.

39. Measure signals listed in column 1 of table 2 on the DVM by setting CROSSBAR CONTROL to positions indicated in column 2. Record indications on data sheet and continue to record DSKY indications every 15 minutes.

NOTE: When making dc measurements, place the PAVM VOLTMETER INPUT switch to OFF and the SCOPE "A" INPUT SIGNAL switch to OFF.

40. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.

41. After six hours have been completed, adjust AGE VOLTAGE ADJUST knob on the TEST CONTROL panel until the DVM indicates 30.8 volts dc.

42. Repeat step 39 and record indications.

43. Repeat step 40.

44. After seven hours have been completed, adjust AGE VOLTAGE ADJUST knob on the

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TEST LOCATION	LATITUDE 1	LATITUDE 2
ACSP	+ 11916	+ 45195
NAA	+ 09422	+ 81021
MSC	+ 08210	+ 14662
MILA	+ 01297	+ 79484

TABLE 1

TEST CONTROL panel until the DVM indicates 28.8 (±0.25) volts dc. Record indications on data sheet.

45. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.

46. Enter (and verify) 00 into G & N AGC DSKY. Press ENTER pushbutton.

47. Set TRANSFER switch to MANUAL and press COARS ALIGN pushbutton on IMU CONTROL panel.

48. Enter VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.

49. Enter +00000 into G & N AGC DSKY three times, pressing ENTER pushbutton after each entry.

50. See JDC 10008, Section I or II for G & N System turn off.

51. Every time this JDC is performed, send a copy of all data sheets immediately to:

Inertial Subsystem Development Division
Mail Station #63
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Mass. - 02142

JOB GYRO COMPASSING TEST **JDC** 10092 **REV** E **PAGE** 5 **OF** 5

SUBSYSTEM G & N SYSTEM **ASSY**

	1 SIGNAL	2 CROSSBAR CONTROL NO.	3 SIGNAL LOCATION
a.	28 volts dc AGC	193	56P9 pins 64 (high) and 63 (low)
b.	28 volts dc OPERATE/IMU	220	56P9 pins 49 (high) and 48 (low)
c.	28 volts dc OPTICS	200	56P9 pins 6 (high) and 5 (low)
d.	IMU 28 volts 1% 800 cps	121	56P9 pins 11 (high) and 12 (low)
e.	IMU 28 volts 5% 800 cps 0° PH A	122	56P9 pins 32 (high) and 50 (low)
f.	IMU 28 volts 5% 800 cps -90° PH A	222	56P9 pins 33 (high) and 50 (low)
g.	IMU 28 volts 5% 800 cps -90°	119	56P9 pins 13 (high) and 14 (low)
h.	OPTICS 28 volts 1% 800 cps	101	56P9 pins 125 (high) and 124 (low)
i.	OPTICS 28 volts 5% 800 cps -90°	201	56P9 pins 103 (high) and 102 (low)
j.	25.6 kcps IMU	223	56P9 pins 105 (high) and 87 (low)
k.	25.6 kcps OPTICS	102	56P9 pins 126 (high) and 104 (low)
l.	3.2 kcps 2 volts	123	56P9 pins 70 (high) and 88 (low)
m.	ELECTRONICS-28 volts dc (-27.5)	124	45A1J1 pins 33 (high) and 32 (low)
n.	AGC +3 volts dc	194	56P9 pins 46 (high) and 63 (low)
o.	AGC +13 volts dc	293	56P9 pins 62 (high) and 63 (low)
p.	IMU 28 volts 1% 800 cps (SCS)	221	05A5P3 pins 243 (high) and 242 (low)
q.	+20 vdc cond.	157	56P9 pins 82 (high) and 83 (low)
r.	+2.5 vdc cond.	257	56P9 pins 81 (high) and 65 (low)

TABLE 2

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 13

JDC
NO. 10092
REV. E
INITIAL TORR 21539

JOB GYRO COMPASSING TEST

ASSEMBLY UNDER TEST

TITLE ____________________

SER. NO. ______ **DWG** ______ **REV.** ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________________ **SER. NO.** ______ CAL DATE

NAME ____________________ **SER. NO.** ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION **APPROVED BY** ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
18a	IG CDU (R2)	deg	▨	( )	▨	▨	▨
18b	MG CDU (R3)	deg	▨	( )	▨	▨	▨
18c	OG CDU (R1)	deg	▨	( )	▨	▨	▨
36-15	After 15 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	 ( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-30	After 30 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	 ( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-45	After 45 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	 ( ) ______ ( ) ______ ( )	▨	▨	▨

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 13

JDC
NO. 10092
REV. E

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-60	After 60 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	 ( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-75	After 75 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	 ( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-90	After 90 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	 ( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-105	After 105 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	 ( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-120	After 120 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	 ( ) ______ ( ) ______ ( ) ______	▨	▨	▨
36-120 c	Subtract line 36-120-R1 from line 18c	deg	-0.57	( ) 18c ( ) R1 ( )	+0.57		

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 **OF** 13

JDC
NO. 10092
REV. E

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-120 a	Subtract line 36-120-R2 from line 18a	deg	-0.03	( ) 18a ( ) R2 ( )	+0.03		
36-120 b	Subtract line 36-120-R3 from line 18b	deg	-0.03	( ) 18b ( ) R3 ( )	+0.03		
36-135	Subtract R1 (135) from R1 (120)	deg	-0.06	( ) ______ ( ) ______ ( ) ______	+0.06		
	Subtract R2 (135) from R2 (120)	deg	-0.01	( ) ______ ( ) ______ ( ) ______	+0.01		
	Subtract R3 (135) from R3 (120)	deg	-0.01	( ) ______ ( ) ______ ( ) ______	+0.01		
36-150	Subtract R1 (150) from R1 (120)	deg	-0.06	( ) ______ ( ) ______ ( ) ______	+0.06		
	Subtract R2 (150) from R2 (120)	deg	-0.01	( ) ______ ( ) ______ ( ) ______	+0.01		

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DATA SHEET 8 **OF** 13

JDC
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JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-300	Subtract R1 (300) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (300) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (300) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-315	After 315 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-330	After 330 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-345	After 345 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨

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EQUIPMENT TEST
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JDC
NO. 10092
REV. E

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-360	After 360 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-375	After 375 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-390	After 390 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-405	After 405 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-420	After 420 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
39a	28 VDC AGC	vdc	▨		▨		
39b	28 VDC OPERATE/IMU	vdc	▨		▨		

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JDC
NO. 10092
REV. E

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39c	28 VDC OPTICS	vdc	▨		▨		
39d	IMU 28 VAC, 1%	vac	27.44		28.56		
39e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
39f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
39i	OPTICS 28 VAC, 5%	vac	26.6		29.4		
39j	IMU 2.5 VAC	vac	2.25		2.75		
39k	OPTICS 2.5 VAC	vac	2.25		2.75		
39l	IMU 2 VAC, 1%	vac	1.926		2.004		
39m	-27.5 VDC **	vdc	-21.5		-33.5		
39n	AGC +3 VDC	vdc	2.5		3.5		

** Correct this measurement using "MULT BY" factor to obtain the true value.

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JDC
NO. 10092
REV. E

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39o	AGC +13 VDC	vdc	12		14		
39p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
39q	+20 VDC cond.	vdc	18.45		22.55		
39r	+2.5 VDC cond.	vdc	2.25		2.75		
42a	28 VDC AGC	vdc	▨		▨		
42b	28 VDC OPERATE/IMU	vdc	▨		▨		
42c	28 VDC OPTICS	vdc	▨		▨		
42d	IMU 28 VAC, 1%	vac	27.44		28.56		
42e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
42f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
42i	OPTICS 28 VAC, 5%	vac	26.6		29.4		

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EQUIPMENT TEST
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JDC
NO. 10092
REV. E

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
42j	IMU 2.5 VAC	vac	2.25		2.75		
42k	OPTICS 2.5 VAC	vac	2.25		2.75		
42l	IMU 2 VAC, 1%	vac	1.926		2.004		
42m	-27.5 VDC **	vdc	-21.5		-33.5		
42n	AGC +3 VDC	vdc	2.5		3.5		
42o	AGC +13 VDC	vdc	12		14		
42p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
42q	+20 VDC cond.	vdc	18.45		22.55		
42r	+2.5 VDC cond.	vdc	2.25		2.75		
44	28 VDC AGC	vdc	28.55		29.05		
27 28 29 30 31 32 35	AGC Display	All Displays responded as required. (Record discrepancies in REMARKS portion of data sheet).					

REMARKS:

** Correct this measurement using "MULT BY" factor to obtain the true value.

DATE 21 SEP 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 **OF** 13

CONFIDENTIAL
(When Filled In)

JDC
NO. 10092
REV. E

JOB GYRO COMPASSING TEST

CALCULATION SHEET

(a) Obtain the following data from JDC 10093 or JDC's 15236, 15237, 15240, 15243 whichever is latest.

$ADIA_x$	(MERU)
NBD_x	(MERU)
NBD_y	(MERU)
NBD_z	(MERU)

Entries for drift compensation (five significant figures only)

(b) for step 26

± Y Drift = (NBD_y) (-.0060843) = ( ).-----

(c) for step 28

± Z Drift = (NBD_z) (-.0060843) = ( ).-----

(d) for step 29

± X Drift = $\left[(ADIA_x) + (NBD_x)\right]$ (-.0060843) = ( ).-----

CONFIDENTIAL
(When Filled In)

DATE 21 SEP 65

TDRR 21530 AUG 12 1965

JOB GYRO COMPASSING TEST | JDC 10092 REV. - PAGE 1 OF 5
INITIAL TDRR - D.S. PGS 13

SUBSYSTEM G & N SYSTEM | ASSY. /

DESCRIPTION This test demonstrates the ability of the gyro stabilized platform (in conjunction with the Prelaunch Alignment program) to maintain a local vertical erection with Z SM pointing at an azimuth of 90°. The effects of high and low prime power variation on power supply outputs is also demonstrated.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES Paragraphs 3-3.1 and 3-3.7 of ATP 1026000.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. This JDC cannot be performed within one-hour of performing JDC 10008, 10033, 10086.

1. Insure that G & N Mounting Fixture is tilted to 0.0°.

2. Set TRANSFER switch on IMU CONTROL panel to COMPUTER.

3. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton.

4. Enter (and verify) VERB 71 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display will indicate 51 XX.

NOTE: If NOUN XX is written in procedure disregard Noun indication.

Look only for requested indications on AGC DSKY including R1, R2 and R3.

5. Insure that TRACKER POWER switch is set to OFF, TRACKER pushbutton light off, CONTROLLER MODE switch to DIRECT, Optics Mode switch to ZERO OPTICS, and CONTROLLER SPEED switch to MED.

6. After ZERO ENCODER condition lamp goes out, set Optics Mode switch to MANUAL. Drive SHAFT ANGLE CDU to 270.0°. Set CONTROLLER SPEED switch to LO.

7. Sight through SXT eyepiece and adjust G & N Mounting Fixture until horizontal reticle line of SXT is coincident with dot and horizontal reticle line of target #1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB GYRO COMPASSING TEST | JDC 10092 REV - PAGE 2 OF 5

SUBSYSTEM G & N SYSTEM | ASSY

8. Manipulate the control stick vertically to position the StLOS until the vertical reticle line is approaching the dot and vertical reticle line of target #1. Press the MARK pushbutton at the instant of coincidence. Enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

9. Set Optics Mode switch to ZERO OPTICS. When ZERO ENCODER lamp goes out, set Optics Mode switch to MANUAL and CONTROLLER SPEED switch to #1. Drive 2X TRUNNION and SHAFT ANGLE CDU's to 90.0° and 270.0°, respectively. Set CONTROLLER SPEED switch to LO.

10. Sight through SXT eyepiece and using control stick position the StLOS until the center of the SXT reticle is approaching the reticle dot of target #3.

11. Press MARK pushbutton at the instant of coincidence and enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

12. The AGC now zeros the IMU CDU's, the ZERO ENCODER lamp shall light, and VERB 06, NOUN 66 will appear on G & N AGC DSKY VERB-NOUN display.

NOTE: If test is performed at MIT/IL-7 proceed to step 16.

13. Enter VERB 24 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

14. Enter address 00763_8 into G & N AGC DSKY. Press ENTER pushbutton.

15. Enter LATITUDE 1 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.

16. Enter LATITUDE 2 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter VERB 33 into G & N AGC DSKY. Press ENTER pushbutton and record time.

18. After 1 minute, enter (and verify) VERB 06, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton and record the DSKY indications on R1 into 18c, R2 into 18a, and R3 into 18b on data sheet.

19. After recording angles, enter (and verify) VERB 36 in G & N AGC DSKY. Press ENTER pushbutton and ignore PROG ALARM lamp. Press ERROR RESET pushbutton.

20. Enter (and verify) VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.

21. Enter +27000 into G & N AGC DSKY. Press ENTER pushbutton.

22. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.

23. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.

24. Enter (and verify) VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

25. Enter address 00760 into G & N AGC DSKY. Press ENTER pushbutton.

DATE ______

JOB GYRO COMPASSING TEST | JDC 10092 REV - PAGE 3 OF 5

SUBSYSTEM G & N SYSTEM | ASSY

26. Enter (and verify) ± Y Drift from (b) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton.

27. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton. Row 3 shall indicate 00761.

28. Enter (and verify) ± Z Drift from (c) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00762.

29. Enter (and verify) ± X Drift from (d) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00763.

30. Enter (and verify) LATITUDE 1 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00764.

31. Enter (and verify) LATITUDE 2 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00765.

32. Enter (and verify) +25000 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00766.

33. Enter (and verify) +00000 into G & N AGC DSKY. Press ENTER pushbutton.

34. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.

35. Enter (and verify) 02 into G & N AGC DSKY. Press ENTER pushbutton. Program display shall indicate 01.

36. Every 15 minutes for seven hours enter (and verify) VERB 06, NOUN 20 and press ENTER pushbutton. Record indications of R1, R2, and R3 and perform calculations if indicated on data sheet.

37. After five hours have been completed, monitor 28 VDC AGC on DVM by setting CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.

38. Adjust AGE VOLTAGE ADJUST knob on TEST CONTROL panel until the DVM indicates 25.8 volts dc.

39. Measure signals listed in column 1 of table 2 on the DVM by setting CROSSBAR CONTROL to positions indicated in column 2. Record indications on data sheet and continue to record DSKY indications every 15 minutes.

NOTE: When making dc measurements, place the PAVM VOLTMETER INPUT switch to OFF and the SCOPE "A" INPUT SIGNAL switch to OFF.

40. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.

41. After six hours have been completed, adjust AGE VOLTAGE ADJUST knob on the TEST CONTROL panel until the DVM indicates 30.8 volts dc.

42. Repeat step 39 and record indications.

43. Repeat step 40.

44. After seven hours have been completed, adjust AGE VOLTAGE ADJUST knob on the TEST CONTROL panel until the DVM indicates 27.5 (±0.25) volts dc. Record indications on data sheet.

DATE ______

JOB GYRO COMPASSING TEST | JDC 10092 REV - PAGE 4 OF 5

SUBSYSTEM G & N SYSTEM | ASSY

TEST LOCATION	LATITUDE 1	LATITUDE 2
ACSP	+ 11916	+ 45195
NAA	+ 09422	+ 81021
MSC	+ 08210	+ 14662
MILA	+01297	+79484

TABLE 1

45. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.

46. Enter (and verify) 00 into G & N AGC DSKY. Press ENTER pushbutton.

47. Set TRANSFER switch to MANUAL and press COARS ALIGN pushbutton on IMU CONTROL panel.

48. Enter VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.

49. Enter +00000 into G & N AGC DSKY three times, pressing ENTER pushbutton after each entry.

50. See JDC 10008, Section I or II for G & N System turn off.

51. Every time this JDC is performed, send a copy of all data sheets immediately to:

Inertial Subsystem Development Division
Mail Station #63
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Mass. - 02142

DATE ______

JOB GYRO COMPASSING TEST

JDC 10092 REV - PAGE 5 OF 5

SUBSYSTEM G & N SYSTEM

ASSY

	1 SIGNAL	2 CROSSBAR CONTROL NO.	3 SIGNAL LOCATION
a.	28 volts dc AGC	193	56P9 pins 64 (high) and 63 (low)
b.	28 volts dc OPERATE/IMU	220	56P9 pins 49 (high) and 48 (low)
c.	28 volts dc OPTICS	200	56P9 pins 6 (high) and 5 (low)
d.	IMU 28 volts 1% 800 cps	121	56P9 pins 11 (high) and 12 (low)
e.	IMU 28 volts 5% 800 cps 0° PH A	122	56P9 pins 32 (high) and 50 (low)
f.	IMU 28 volts 5% 800 cps -90° PH A	222	56P9 pins 33 (high) and 50 (low)
g.	IMU 28 volts 5% 800 cps -90°	119	56P9 pins 13 (high) and 14 (low)
h.	OPTICS 28 volts 1% 800 cps	101	56P9 pins 125 (high) and 124 (low)
i.	OPTICS 28 volts 5% 800 cps -90°	201	56P9 pins 103 (high) and 102 (low)
j.	25.6 kcps IMU	223	56P9 pins 105 (high) and 87 (low)
k.	25.6 kcps OPTICS	102	56P9 pins 126 (high) and 104 (low)
l.	3.2 kcps 2 volts	123	56P9 pins 70 (high) and 88 (low)
m.	ELECTRONICS-28 volts dc (-27.5)	124	45A1J1 pins 33 (high) and 32 (low)
n.	AGC +3 volts dc	194	56P9 pins 46 (high) and 63 (low)
o.	AGC +13 volts dc	293	56P9 pins 62 (high) and 63 (low)
p.	IMU 28 volts 1% 800 cps (SCS)	221	05A5P3 pins 243 (high) and 242 (low)
q.	+20 vdc cond.	157	56P9 pins 82 (high) and 83 (low)
r.	+2.5 vdc cond.	257	56P9 pins 81 (high) and 65 (low)

TABLE 2

DATE ________

TDRR 21539 AUG 12 1965

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 13

JDC
NO. 10092
REV. -
INITIAL TDRR -

JOB GYRO COMPASSING TEST

ASSEMBLY UNDER TEST

TITLE ________

SER. NO. ________ DWG ________ REV. ________

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION

TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ CAL DATE

NAME ________ SER. NO. ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
18a	IG CDU (R2)	deg	▨	( )	▨	▨	▨
18b	MG CDU (R3)	deg	▨	( )	▨	▨	▨
18c	OG CDU (R1)	deg	▨	( )	▨	▨	▨
36-15	After 15 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ________ ( ) ________ ( ) ________	▨	▨	▨
36-30	After 30 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ________ ( ) ________ ( ) ________	▨	▨	▨
36-45	After 45 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ________ ( ) ________ ( )	▨	▨	▨

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 13

JDC
NO. 10092
REV -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-60	After 60 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ________ ( ) ________ ( ) ________	▨	▨	▨
36-75	After 75 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ________ ( ) ________ ( ) ________	▨	▨	▨
36-90	After 90 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ________ ( ) ________ ( ) ________	▨	▨	▨
36-105	After 105 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ________ ( ) ________ ( ) ________	▨	▨	▨
36-120	After 120 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ________ ( ) ________ ( ) ________	▨	▨	▨
36-120 c	Subtract line 36-120-R1 from line 18c	deg	-0.57	( ) 18c ( ) R1 ( ) ________	+0.57		

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-120 a	Subtract line 36-120-R2 from line 18a	deg	-0.03	( ) 18a ( ) R2 ( ) ________	+0.03		
36-120 b	Subtract line 36-120-R3 from line 18b	deg	-0.03	( ) 18b ( ) R3 ( ) ________	+0.03		
36-135	Subtract R1 (135) from R1 (120)	deg	-0.06	( ) ________ ( ) ________ ( ) ________	+0.06		
	Subtract R2 (135) from R2 (120)	deg	-0.01	( ) ________ ( ) ________ ( ) ________	+0.01		
	Subtract R3 (135) from R3 (120)	deg	-0.01	( ) ________ ( ) ________ ( ) ________	+0.01		
36-150	Subtract R1 (150) from R1 (120)	deg	-0.06	( ) ________ ( ) ________ ( ) ________	+0.06		
	Subtract R2 (150) from R2 (120)	deg	-0.01	( ) ________ ( ) ________ ( ) ________	+0.01		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-150 (cont)	Subtract R3 (150) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-165	Subtract R1 (165) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (165) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (165) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-180	Subtract R1 (180) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (180) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (180) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-195	Subtract R1 (195) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (195) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (195) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-210	Subtract R1 (210) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (210) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (210) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-225	Subtract R1 (225) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-225 (cont)	Subtract R2 (225) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (225) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-240	Subtract R1 (240) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (240) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (240) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-255	Subtract R1 (255) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (255) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-255 (cont)	Subtract R3 (255) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-270	Subtract R1 (270) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (270) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (270) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-285	Subtract R1 (285) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (285) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (285) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-300	Subtract R1 (300) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (300) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (300) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-315	After 315 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-330	After 330 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-345	After 345 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-360	After 360 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-375	After 375 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-390	After 390 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-405	After 405 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-420	After 420 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
39a	28 VDC AGC	vdc	▨		▨		
39b	28 VDC OPERATE/IMU	vdc	▨		▨		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39c	28 VDC OPTICS	vdc	▨		▨		
39d	IMU 28 VAC, 1%	vac	27.44		28.56		
39e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
39f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
39i	OPTICS 28 VAC, 5%	vac	26.6		29.4		
39j	IMU 2.5 VAC	vac	2.375		2.625		
39k	OPTICS 2.5 VAC	vac	2.375		2.625		
39l	IMU 2 VAC, 1%	vac	1.926		2.004		
39m	-27.5 VDC **	vdc	-21.5		-33.5		
39n	AGC +3 VDC	vdc	2.5		3.5		

** Correct this measurement using "MULT BY" factor specified on drawing 1902141-003 or 1902141-004 to obtain the true value.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39o	AGC +13 VDC	vdc	12		14		
39p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
39q	+20 VDC cond.	vdc	18.45		22.55		
39r	+2.5 VDC cond.	vdc	2.25		2.75		
42a	28 VDC AGC	vdc	▨		▨		
42b	28 VDC OPERATE/IMU	vdc	▨		▨		
42c	28 VDC OPTICS	vdc	▨		▨		
42d	IMU 28 VAC, 1%	vac	27.44		28.56		
42e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
42f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
42i	OPTICS 28 VAC, 5%	vac	26.6		29.4		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 OF 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
42j	IMU 2.5 VAC	vac	2.375		2.625		
42k	OPTICS 2.5 VAC	vac	2.375		2.625		
42l	IMU 2 VAC, 1%	vac	1.926		2.004		
42m	-27.5 VDC **	vdc	-21.5		-33.5		
42n	AGC +3 VDC	vdc	2.5		3.5		
42o	AGC +13 VDC	vdc	12		14		
42p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
42q	+20 VDC cond.	vdc	18.45		22.55		
42r	+2.5 VDC cond.	vdc	2.25		2.75		
44	28 VDC AGC	vdc	27.25		27.75		
27 28 29 30 31 32 35	AGC Display	All Displays responded as required. (Record discrepancies in REMARKS portion of data sheet).					

REMARKS:

** Correct this measurement using "MULT BY" factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 OF 13

CONFIDENTIAL
(When Filled In)

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

CALCULATION SHEET

(a) Obtain the following data from JDC 10093 or JDC's 15236, 15237, 15240, 15243 whichever is latest.

$ADIA_x$	(MERU)
NBD_x	(MERU)
NBD_y	(MERU)
NBD_z	(MERU)

Entries for drift compensation (five significant figures only)

(b) for step 26

± Y Drift = (NBD_y) (-.0060843) = ( ).-----

(c) for step 28

± Z Drift = (NBD_z) (-.0060843) = ( ).-----

(d) for step 29

± X Drift = $\left[(ADIA_x) + (NBD_x)\right]$ (-.0060843) = ( ).-----

CONFIDENTIAL
(When Filled In)

DATE ________

TDRR 2 1 5 3 0 AUG 12 1965

JOB GYRO COMPASSING TEST

JDC 10092 REV. - PAGE 1 OF 5

INITIAL TDRR - D.S. PGS 13

SUBSYSTEM G & N SYSTEM

ASSY. /

DESCRIPTION This test demonstrates the ability of the gyro stabilized platform (in conjunction with the Prelaunch Alignment program) to maintain a local vertical erection with Z SM pointing at an azimuth of 90°. The effects of high and low prime power variation on power supply outputs is also demonstrated.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES Paragraphs 3-3.1 and 3-3.7 of ATP 1026000.

IMPORTANT See below.

INTERVAL

TOOLS AND MATERIAL Per paragraph 3-2 of ATP 1026000.

IMPORTANT: 1. Proceed with this JDC if JDC 10033 has been completed and system operation has not been interrupted. If system operation has been interrupted, perform JDC 10008, Part III before proceeding with this JDC.

2. This JDC cannot be performed within one-hour of performing JDC 10008, 10033, 10086.

1. Insure that G & N Mounting Fixture is tilted to 0.0°.

2. Set TRANSFER switch on IMU CONTROL panel to COMPUTER.

3. Enter (and verify) VERB 36 into G & N AGC DSKY. Press ENTER pushbutton.

4. Enter (and verify) VERB 71 into G & N AGC DSKY. Press ENTER pushbutton. The VERB-NOUN display will indicate 51 XX.

NOTE: If NOUN XX is written in procedure disregard Noun indication.

Look only for requested indications on AGC DSKY including R1, R2 and R3.

5. Insure that TRACKER POWER switch is set to OFF, TRACKER pushbutton light off, CONTROLLER MODE switch to DIRECT, Optics Mode switch to ZERO OPTICS, and CONTROLLER SPEED switch to MED.

6. After ZERO ENCODER condition lamp goes out, set Optics Mode switch to MANUAL. Drive SHAFT ANGLE CDU to 270.0°. Set CONTROLLER SPEED switch to LO.

7. Sight through SXT eyepiece and adjust G & N Mounting Fixture until horizontal reticle line of SXT is coincident with dot and horizontal reticle line of target #1.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB GYRO COMPASSING TEST

JDC 10092 REV - PAGE 2 OF 5

SUBSYSTEM G & N SYSTEM

ASSY

8. Manipulate the control stick vertically to position the StLOS until the vertical reticle line is approaching the dot and vertical reticle line of target #1. Press the MARK pushbutton at the instant of coincidence. Enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

9. Set Optics Mode switch to ZERO OPTICS. When ZERO ENCODER lamp goes out, set Optics Mode switch to MANUAL and CONTROLLER SPEED switch to #1. Drive 2X TRUNNION and SHAFT ANGLE CDU's to 90.0° and 270.0°, respectively. Set CONTROLLER SPEED switch to LO.

10. Sight through SXT eyepiece and using control stick position the StLOS until the center of the SXT reticle is approaching the reticle dot of target #3.

11. Press MARK pushbutton at the instant of coincidence and enter VERB 52 into G & N AGC DSKY. Press ENTER pushbutton.

12. The AGC now zeros the IMU CDU's, the ZERO ENCODER lamp shall light, and VERB 06, NOUN 66 will appear on G & N AGC DSKY VERB-NOUN display.

NOTE: If test is performed at MIT/IL-7 proceed to step 16.

13. Enter VERB 24 NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

14. Enter address 00763_8 into G & N AGC DSKY. Press ENTER pushbutton.

15. Enter LATITUDE 1 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.

16. Enter LATITUDE 2 (Table 1) for appropriate location into G & N AGC DSKY. Press ENTER pushbutton.

17. Enter VERB 33 into G & N AGC DSKY. Press ENTER pushbutton and record time.

18. After 1 minute, enter (and verify) VERB 06, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton and record the DSKY indications on R1 into 18c, R2 into 18a, and R3 into 18b on data sheet.

19. After recording angles, enter (and verify) VERB 36 in G & N AGC DSKY. Press ENTER pushbutton and ignore PROG ALARM lamp. Press ERROR RESET pushbutton.

20. Enter (and verify) VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.

21. Enter +27000 into G & N AGC DSKY. Press ENTER pushbutton.

22. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.

23. Enter +00000 into G & N AGC DSKY. Press ENTER pushbutton.

24. Enter (and verify) VERB 21, NOUN 01 into G & N AGC DSKY. Press ENTER pushbutton.

25. Enter address 00760 into G & N AGC DSKY. Press ENTER pushbutton.

DATE ______

JOB GYRO COMPASSING TEST

JDC 10092 REV - PAGE 3 OF 5

SUBSYSTEM G & N SYSTEM

ASSY

26. Enter (and verify) ± Y Drift from (b) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton.

27. Enter (and verify) NOUN 15 into G & N AGC DSKY. Press ENTER pushbutton. Row 3 shall indicate 00761.

28. Enter (and verify) ± Z Drift from (c) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00762.

29. Enter (and verify) ± X Drift from (d) of calculation sheet into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00763.

30. Enter (and verify) LATITUDE 1 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00764.

31. Enter (and verify) LATITUDE 2 from Table 1 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00765.

32. Enter (and verify) +25000 into G & N AGC DSKY. Press ENTER pushbutton twice. Row 3 shall indicate 00766.

33. Enter (and verify) +00000 into G & N AGC DSKY. Press ENTER pushbutton.

34. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.

35. Enter (and verify) 02 into G & N AGC DSKY. Press ENTER pushbutton. Program display shall indicate 01.

36. Every 15 minutes for seven hours enter (and verify) VERB 06, NOUN 20 and press ENTER pushbutton. Record indications of R1, R2, and R3 and perform calculations if indicated on data sheet.

37. After five hours have been completed, monitor 28 VDC AGC on DVM by setting CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.

38. Adjust AGE VOLTAGE ADJUST knob on TEST CONTROL panel until the DVM indicates 25.8 volts dc.

39. Measure signals listed in column 1 of table 2 on the DVM by setting CROSSBAR CONTROL to positions indicated in column 2. Record indications on data sheet and continue to record DSKY indications every 15 minutes.

NOTE: When making dc measurements, place the PAVM VOLTMETER INPUT switch to OFF and the SCOPE "A" INPUT SIGNAL switch to OFF.

40. Set CROSSBAR CONTROL on PRIMARY SIGNAL SELECTOR to 175 for BUS A power or 275 for BUS B power.

41. After six hours have been completed, adjust AGE VOLTAGE ADJUST knob on the TEST CONTROL panel until the DVM indicates 30.8 volts dc.

42. Repeat step 39 and record indications.

43. Repeat step 40.

44. After seven hours have been completed, adjust AGE VOLTAGE ADJUST knob on the

DATE ______

JOB GYRO COMPASSING TEST

JDC 10092 REV - PAGE 4 OF 5

SUBSYSTEM G & N SYSTEM

ASSY

TEST LOCATION	LATITUDE 1	LATITUDE 2
ACSP	+ 11916	+ 45195
NAA	+ 09422	+ 81021
MSC	+ 08210	+ 14662
MILA	+01297	+79484

TABLE 1

TEST CONTROL panel until the DVM indicates 27.5 (±0.25) volts dc. Record indications on data sheet.

45. Enter (and verify) VERB 37 into G & N AGC DSKY. Press ENTER pushbutton.

46. Enter (and verify) 00 into G & N AGC DSKY. Press ENTER pushbutton.

47. Set TRANSFER switch to MANUAL and press COARS ALIGN pushbutton on IMU CONTROL panel.

48. Enter VERB 25, NOUN 22 into G & N AGC DSKY. Press ENTER pushbutton.

49. Enter +00000 into G & N AGC DSKY three times, pressing ENTER pushbutton after each entry.

50. See JDC 10008, Section I or II for G & N System turn off.

51. Every time this JDC is performed, send a copy of all data sheets immediately to:

Inertial Subsystem Development Division
Mail Station #63
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Mass. - 02142

DATE ______

JOB GYRO COMPASSING TEST JDC 10092 REV - PAGE 5 OF 5

SUBSYSTEM G & N SYSTEM ASSY

	1 SIGNAL	2 CROSSBAR CONTROL NO.	3 SIGNAL LOCATION
a.	28 volts dc AGC	193	56P9 pins 64 (high) and 63 (low)
b.	28 volts dc OPERATE/IMU	220	56P9 pins 49 (high) and 48 (low)
c.	28 volts dc OPTICS	200	56P9 pins 6 (high) and 5 (low)
d.	IMU 28 volts 1% 800 cps	121	56P9 pins 11 (high) and 12 (low)
e.	IMU 28 volts 5% 800 cps 0° PH A	122	56P9 pins 32 (high) and 50 (low)
f.	IMU 28 volts 5% 800 cps -90° PH A	222	56P9 pins 33 (high) and 50 (low)
g.	IMU 28 volts 5% 800 cps -90°	119	56P9 pins 13 (high) and 14 (low)
h.	OPTICS 28 volts 1% 800 cps	101	56P9 pins 125 (high) and 124 (low)
i.	OPTICS 28 volts 5% 800 cps -90°	201	56P9 pins 103 (high) and 102 (low)
j.	25.6 kcps IMU	223	56P9 pins 105 (high) and 87 (low)
k.	25.6 kcps OPTICS	102	56P9 pins 126 (high) and 104 (low)
l.	3.2 kcps 2 volts	123	56P9 pins 70 (high) and 88 (low)
m.	ELECTRONICS-28 volts dc (-27.5)	124	45A1J1 pins 33 (high) and 32 (low)
n.	AGC +3 volts dc	194	56P9 pins 46 (high) and 63 (low)
o.	AGC +13 volts dc	293	56P9 pins 62 (high) and 63 (low)
p.	IMU 28 volts 1% 800 cps (SCS)	221	05A5P3 pins 243 (high) and 242 (low)
q.	+20 vdc cond.	157	56P9 pins 82 (high) and 83 (low)
r.	+2.5 vdc cond.	257	56P9 pins 81 (high) and 65 (low)

TABLE 2

DATE

TDRR 21539 AUG 12 1965

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 13

JDC
NO. 10092
REV. -
INITIAL TDRR -

JOB GYRO COMPASSING TEST

ASSEMBLY UNDER TEST
TITLE
SER. NO. DWG REV.

TEST HISTORY
DATE START END SITE / LOCATION
TIME START END TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME SER. NO. CAL DATE
NAME SER. NO. CAL DATE

CONDUCTED BY NAME/AFFILIATION APPROVED BY NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
18a	IG CDU (R2)	deg	▨	( )	▨	▨	▨
18b	MG CDU (R3)	deg	▨	( )	▨	▨	▨
18c	OG CDU (R1)	deg	▨	( )	▨	▨	▨
36-15	After 15 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-30	After 30 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-45	After 45 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨

DATE

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-60	After 60 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-75	After 75 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-90	After 90 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-105	After 105 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-120	After 120 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-120 c	Subtract line 36-120-R1 from line 18c	deg	-0.57	( ) 18c ( ) R1 ( )	+0.57		

DATE

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 13

JDC
NO. 10092
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JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-120 a	Subtract line 36-120-R2 from line 18a	deg	-0.03	( ) 18a ( ) R2 ( )	+0.03		
36-120 b	Subtract line 36-120-R3 from line 18b	deg	-0.03	( ) 18b ( ) R3 ( )	+0.03		
36-135	Subtract R1 (135) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (135) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (135) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-150	Subtract R1 (150) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (150) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		

DATE

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-150 (cont)	Subtract R3 (150) from R3 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
36-165	Subtract R1 (165) from R1 (120)	deg	-0.06	( ) ____ ( ) ____ ( ) ____	+0.06		
	Subtract R2 (165) from R2 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
	Subtract R3 (165) from R3 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
36-180	Subtract R1 (180) from R1 (120)	deg	-0.06	( ) ____ ( ) ____ ( ) ____	+0.06		
	Subtract R2 (180) from R2 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
	Subtract R3 (180) from R3 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-195	Subtract R1 (195) from R1 (120)	deg	-0.06	( ) ____ ( ) ____ ( ) ____	+0.06		
	Subtract R2 (195) from R2 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
	Subtract R3 (195) from R3 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
36-210	Subtract R1 (210) from R1 (120)	deg	-0.06	( ) ____ ( ) ____ ( ) ____	+0.06		
	Subtract R2 (210) from R2 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
	Subtract R3 (210) from R3 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
36-225	Subtract R1 (225) from R1 (120)	deg	-0.06	( ) ____ ( ) ____ ( ) ____	+0.06		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 13

JDC
NO. 10092
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JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-225 (cont)	Subtract R2 (225) from R2 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
	Subtract R3 (225) from R3 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
36-240	Subtract R1 (240) from R1 (120)	deg	-0.06	( ) ____ ( ) ____ ( ) ____	+0.06		
	Subtract R2 (240) from R2 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
	Subtract R3 (240) from R3 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
36-255	Subtract R1 (255) from R1 (120)	deg	-0.06	( ) ____ ( ) ____ ( ) ____	+0.06		
	Subtract R2 (255) from R2 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-255 (cont)	Subtract R3 (255) from R3 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
36-270	Subtract R1 (270) from R1 (120)	deg	-0.06	( ) ____ ( ) ____ ( ) ____	+0.06		
	Subtract R2 (270) from R2 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
	Subtract R3 (270) from R3 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
36-285	Subtract R1 (285) from R1 (120)	deg	-0.06	( ) ____ ( ) ____ ( ) ____	+0.06		
	Subtract R2 (285) from R2 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		
	Subtract R3 (285) from R3 (120)	deg	-0.01	( ) ____ ( ) ____ ( ) ____	+0.01		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 **OF** 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-300	Subtract R1 (300) from R1 (120)	deg	-0.06	( ) ( ) ( )	+0.06		
	Subtract R2 (300) from R2 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
	Subtract R3 (300) from R3 (120)	deg	-0.01	( ) ( ) ( )	+0.01		
36-315	After 315 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-330	After 330 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-345	After 345 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36-360	After 360 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-375	After 375 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-390	After 390 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-405	After 405 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
36-420	After 420 min OG CDU (R1) IG CDU (R2) MG CDU (R3)	deg	▨	( ) ( ) ( )	▨	▨	▨
39a	28 VDC AGC	vdc	▨		▨		
39b	28 VDC OPERATE/IMU	vdc	▨		▨		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39c	28 VDC OPTICS	vdc	▨		▨		
39d	IMU 28 VAC, 1%	vac	27.44		28.56		
39e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
39f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
39h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
39i	OPTICS 28 VAC, 5%	vac	26.6		29.4		
39j	IMU 2.5 VAC	vac	2.375		2.625		
39k	OPTICS 2.5 VAC	vac	2.375		2.625		
39l	IMU 2 VAC, 1%	vac	1.926		2.004		
39m	-27.5 VDC **	vdc	-21.5		-33.5		
39n	AGC +3 VDC	vdc	2.5		3.5		

** Correct this measurement using "MULT BY" factor specified on drawing 1902141-003 or 1902141-004 to obtain the true value.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
39o	AGC +13 VDC	vdc	12		14		
39p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
39q	+20 VDC cond.	vdc	18.45		22.55		
39r	+2.5 VDC cond.	vdc	2.25		2.75		
42a	28 VDC AGC	vdc	▨		▨		
42b	28 VDC OPERATE/IMU	vdc	▨		▨		
42c	28 VDC OPTICS	vdc	▨		▨		
42d	IMU 28 VAC, 1%	vac	27.44		28.56		
42e	IMU 28 VAC, 5% (0°)	vac	25.2		30.8		
42f	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42g	IMU 28 VAC, 5% (-90°)	vac	26.6		29.4		
42h	OPTICS 28 VAC, 1%	vac	27.44		28.56		
42i	OPTICS 28 VAC, 5%	vac	26.6		29.4		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 OF 13

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
42j	IMU 2.5 VAC	vac	2.375		2.625		
42k	OPTICS 2.5 VAC	vac	2.375		2.625		
42l	IMU 2 VAC, 1%	vac	1.926		2.004		
42m	-27.5 VDC **	vdc	-21.5		-33.5		
42n	AGC +3 VDC	vdc	2.5		3.5		
42o	AGC +13 VDC	vdc	12		14		
42p	IMU 28 VAC, 1% (SCS)	vac	26.6		29.4		
42q	+20 VDC cond.	vdc	18.45		22.55		
42r	+2.5 VDC cond.	vdc	2.25		2.75		
44	28 VDC AGC	vdc	27.25		27.75		
27 28 29 30 31 32 35	AGC Display	All Displays responded as required. (Record discrepancies in REMARKS portion of data sheet).					

REMARKS:

** Correct this measurement using "MULT BY" factor specified on drawings 1902141-003 or 1902141-004 to obtain the true value.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 OF 13

CONFIDENTIAL
(When Filled In)

JDC
NO. 10092
REV. -

JOB GYRO COMPASSING TEST

CALCULATION SHEET

(a) Obtain the following data from JDC 10093 or JDC's 15236, 15237, 15240, 15243 whichever is latest.

$ADIA_x$	(MERU)
NBD_x	(MERU)
NBD_y	(MERU)
NBD_z	(MERU)

Entries for drift compensation (five significant figures only)

(b) for step 26

$\star$ Y Drift = (NBD_y) (-.0060843) = ( ).-----

(c) for step 28

$\star$ Z Drift = (NBD_z) (-.0060843) = ( ).-----

(d) for step 29

$\star$ X Drift = $\left[(ADIA_x) + (NBD_x)\right]$ (-.0060843) = ( ).-----

CONFIDENTIAL
(When Filled In)

DATE ________

TDRR 21539 AUG 12 1965

JOB INSTALLATION AND ALIGNMENT OF PHOTOMETER MIRROR ASSEMBLY

JDC 10097 REV. - PAGE 1 OF 4

INITIAL TDRR ______ D.S. PGS 1

SUBSYSTEM G AND N SYSTEM

ASSY.

DESCRIPTION The Photometer Mirror Assembly is installed on the G and N Fixture Stand. The parallelism of the Photometer and Landmark mirrors is checked and the SXT HPLOS is aligned to the photometer aperture of the photometer mirror assembly.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES Dwg. No. 1019899 and paragraphs 3-2.2.6 and 3-2.2.7 of ATP 1026000.

IMPORTANT Proceed with this JDC if JDC 10033 and JDC 10095 have been completed.

INTERVAL

TOOLS AND MATERIAL Remote Optics Controller

NOTE: Insure that the G and N Mounting Fixture is set to the 0.0° position.

WARNING

The Star Tracker photomultiplier tube may be damaged if it is exposed to ambient light. Insure that the Light Exposure Plug is removed only as directed during testing.

A. PROCEDURE

NOTE: If the G and N indicator control panel is already removed from the G and N System and the Remote Optics Controller is connected to W87 P4, omit steps 1 through 7.

1. Insure that the AUX HTR PWR pushbutton lamp on the TEMPERATURE MONITOR CONTROL panel is lighted.
2. Set the MONITOR METER SELECT switch on the TEMPERATURE MONITOR CONTROL panel to IRIG (MONITOR).
3. Press the PROCEED/ISS STANDBY pushbutton on the TEST CONTROL panel. The pushbutton lamp shall light.
4. Insure that the OPTICS POWER ON pushbutton on the TEST CONTROL panel is not lighted.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB INSTALLATION AND ALIGNMENT OF PHOTOMETER MIRROR ASSEMBLY

JDC 10097 REV - PAGE 2 OF 4

SUBSYSTEM G AND N SYSTEM

ASSY

5. Remove the G and N indicator control panel from the G and N System.
6. Disconnect W87 P4 from the G and N indicator control panel and connect W87 P4 to W93 P1.
7. Connect W93 P2 to the Remote Optics Controller.
8. Press the OPTICS POWER ON pushbutton on the TEST CONTROL panel. The pushbutton lamp shall light.
9. Insure that the following pushbutton and indicator lamps on the Remote Optics Controller are lighted:
    - ZERO OPTICS
    - CONTROLLER DIRECT
    - SXT DRIVE NORMAL
    - SCT DRIVE NORMAL.
10. Insure that the following pushbuttons on the Remote Optics Controller are not lighted:
    - TRACKER
    - TRACKER POWER.
11. Install the Photometer Mirror Assembly on the G and N Fixture Stand and tighten the three clamping screws.
12. Move the Alignment Pin on the S & HS Angle Plate to the 0° (L & P) position.
13. Loosen the four bolts which hold the Sliding Platform on the S & HS in position.
14. Carefully position the Sliding Platform on the S & HS against the Alignment Pin.
15. Tighten the four bolts which hold the Sliding Platform on the S & HS.
16. Set the G and N Mounting Fixture to the -90.0° position.
17. After the ZERO ENCODER lamp goes out, press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller. The MANUAL indicator lamp shall light.
18. Using the SHAFT SLEW CONTROL switch and the COARSE and FINE GAIN CONTROLS on the Remote Optics Controller, drive the SXT in the positive direction until the SHAFT ANGLE CDU indicates 60.000 (±.003)°.
19. Insure that the 2X TRUNNION CDU indicates 0.000 (±.003)°.
20. Set the LAMP SELECTOR switch on the S & HS to STAR and allow a 15 minute warmup.
21. Set the STAR MAGNITUDE control on the S & HS to produce a -0.5 magnitude star (refer to the calibration chart).
22. Roughly position the six arc second star on the optical axis of the S & HS by setting MICROMETER A on the S & HS to 0.7000 and MICROMETER B to 0.5000.

    NOTE: MICROMETER B is located approximately 90° in the cw direction from MICROMETER A when the S & HS is viewed from its east end. Always use the black scale when reading the MICROMETER settings.
23. Using the Adjusting Screws located on the Photometer Mirror Assembly, position

DATE ______

JOB INSTALLATION AND ALIGNMENT OF PHOTOMETER MIRROR ASSEMBLY

JDC 10097 REV - PAGE 3 OF 4

SUBSYSTEM G AND N SYSTEM

ASSY

the star image as close as possible to the center of the SXT field of view. No further adjustments are to be made with the Adjusting Screws.

24. Insure that the SHAFT ANGLE CDU indicates 60.000 (±.003)° and the 2X TRUNNION CDU indicates 0.000 (±.003)°.
25. Rotate the S & HS so that the SXT reticle pattern is aligned to the S & HS MICROSCOPE reticle pattern. MICROMETER A on the S & HS shall then be approximately 30° below horizontal.
26. Install the Autocollimation Mirror over the Photometer Mirror Assembly on the S & HS.
27. Position the S & HS MICROSCOPE eyepiece so that the micrometer drum knob is up.

    NOTE: Three stars will be seen in the S & HS MICROSCOPE field of view:
    Image 'a'. one transmitted directly from the S & HS,
    Image 'b'. one reflected from the landmark mirror, and
    Image 'c'. one reflected from the photometer mirror.
    To determine the identity of the images, alternately cover the landmark and photometer apertures on the Photometer Mirror Assembly. Image 'a' will be unaffected. Image 'b' will disappear when the landmark aperture is covered. Image 'c' will disappear when the photometer aperture is covered.
28. Superimpose the S & HS MICROSCOPE filar on the star image reflected from the landmark mirror. Record as B_L.
29. Superimpose the S & HS MICROSCOPE filar on the star image reflected from the photometer mirror. Record as B_P.
30. Position the S & HS MICROSCOPE eyepiece so that the micrometer drum knob is to the left.
31. Superimpose the S & HS MICROSCOPE filar on the star image reflected from the landmark mirror. Record as A_L.
32. Superimpose the S & HS MICROSCOPE filar on the star image reflected from the photometer mirror. Record as A_P.
33. Calculate and record the errors in parallelism of the landmark and photometer mirrors as follows:

$$\epsilon_{AP} = A_L - A_P$$

$$\epsilon_{BP} = B_L - B_P.$$

34. Remove the Autocollimation Mirror and bracket from the Photometer Mirror Assembly.
35. Set the LAMP SELECTOR switch on the S & HS to OFF.

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JOB INSTALLATION AND ALIGNMENT OF PHOTOMETER MIRROR ASSEMBLY

JDC 10097 REV - PAGE 4 OF 4

SUBSYSTEM G AND N SYSTEM

ASSY

36. Using an auxiliary eyepiece, defocus the S & HS MICROSCOPE eyepiece.
37. While viewing the SXT through the auxiliary eyepiece on the S & HS MICROSCOPE and using the SHAFT SLEW CONTROL switch and the COARSE and FINE GAIN CONTROLS on the Remote Optics Controller, rotate the SXT shaft until the SXT Photometer aperture and the Photometer aperture on the Photometer Mirror Assembly are aligned. Record the indication of the SHAFT ANGLE CDU.
38. Install the Reference Photometer Light Probe on the G and N Fixture Stand.
39. Press the OPTICS POWER ON pushbutton on the TEST CONTROL panel. The pushbutton lamp shall go out.
40. Disconnect W87 P4 from W93 P1 and connect W87 P4 to the G and N indicator control panel.
41. Install the G and N indicator control panel on the G and N System.

DATE ______

59. Repeat steps 13 and 14 for the SXT StLOS.

60. Repeat steps 15 and 16 for the SXT StLOS and record as A_{M4} and A_{D4} respectively on the calculations portion of the data sheet.

61. Perform the calculations indicated in Column (y) of the calculations portion of the data sheet.

62. Repeat steps 18 through 22 for the SXT StLOS.

63. Repeat steps 15 through 22 for the SXT StLOS until eight values of A_{M4} and A_{D4} are obtained.

64. Add the eight rows of Column (y).

65. Perform the calculation indicated in Columns (z) and (aa) of the calculations portion of the data sheet.

66. Record the 2X TRUNNION CDU indication.

67. Enter the resultant of Column (aa) and 5.0 degrees in Column (bb) of the calculations portion of the data sheet (enter the larger of the two in Row 4) and subtract Row 5 from Row 4. Enter resultant as Item 67 on the data sheet. (The sign of the resultant is minus if 5.0 degrees is entered in Row 4 and plus if in Row 5.)

68. Using the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROLS on the REMOTE OPTICS CONTROLLER, drive the SXT until the DSKY trunnion display indicates +53000 (±00003).

69. Repeat steps 13 and 14 for the SXT StLOS.

70. Repeat steps 15 and 16 for the SXT StLOS and record as A_{M5} and A_{D5} respectively on the calculations portion of the data sheet.

71. Perform the calculations indicated in Column (ee) of the calculations portion of the data sheet.

72. Repeat steps 18 through 22 for the SXT StLOS.

73. Repeat steps 15 through 22 for the SXT StLOS until eight values of A_{M5} and A_{D5} are obtained.

74. Add the eight rows of Column (ee).

75. Perform the calculation indicated in Columns (ff) and (gg) of the calculations portion of the data sheet.

76. Record the 2X TRUNNION CDU indication.

77. Enter the resultant of Column (gg) and 53.0 degrees in Column (hh) of the calculations portion of the data sheet (enter the larger of the two in Row 4) and subtract Row 5 from Row 4. Enter resultant as Item 77 on the data sheet. (The sign of the resultant is minus if 53.0 degrees is entered in Row 4 and plus if in Row 5.)

78. Using the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROLS on the REMOTE OPTICS CONTROLLER,

DATE ________

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drive the SXT until the DSKY trunnion display indicates +50000 (±00003).

79. Repeat steps 13 and 14 for the SXT StLOS.

80. Repeat steps 15 and 16 for the SXT StLOS and record as A_{M6} and A_{D6} respectively on the calculations portion of the data sheet.

81. Perform the calculations indicated in Column (kk) of the calculations portion of the data sheet.

82. Repeat steps 18 through 22 for the SXT StLOS.

83. Repeat steps 15 through 22 for the SXT StLOS until eight values of A_{M6} and A_{D6} are obtained.

84. Add the eight rows of Column (kk).

85. Perform the calculation indicated in Columns (ll) and (mm) of the calculations portion of the data sheet.

86. Record the 2X TRUNNION CDU indication.

87. Enter the resultant of Column (mm) and 50.0 degrees in Column (nn) of the calculations portion of the data sheet (enter the larger of the two in Row 4) and subtract Row 5 from Row 4. Enter resultant as Item 87 on the data sheet. (The sign of the resultant is minus if 50.0 degrees is entered in Row 4 and plus if in Row 5.)

88. Using the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROLS on the REMOTE OPTICS CONTROLLER, drive the SXT until the DSKY trunnion display indicates +20000 (±00003).

89. Repeat steps 13 and 14 for the SXT StLOS.

90. Repeat steps 15 and 16 for the SXT StLOS and record as A_{M7} and A_{D7} respectively on the calculations portion of the data sheet.

91. Perform the calculations indicated in Column (qq) of the calculations portion of the data sheet.

92. Repeat steps 18 through 22 for the SXT StLOS.

93. Repeat steps 15 through 22 for the SXT StLOS until eight values of A_{M7} and A_{D7} are obtained.

94. Add the eight rows of Column (qq).

95. Perform the calculation indicated in Columns (rr) and (ss) of the calculations portion of the data sheet.

96. Record the 2X TRUNNION CDU indication.

97. Enter the resultant of Column (ss) and 20.0 degrees in Column (tt) of the calculations portion of the data sheet (enter the larger of the two in Row 4) and subtract Row 5 from Row 4. Enter resultant as Item 97 on the data sheet. (The sign of the resultant is minus if 20.0 degrees is entered in Row 4 and plus if in Row 5.)

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98. Using the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROLS on the REMOTE OPTICS CONTROLLER, drive the SXT until the DSKY trunnion display indicates +40000 (±00003).

99. Repeat steps 13 and 14 for the SXT StLOS.

100. Repeat steps 15 and 16 for the SXT StLOS and record as A_{M8} and A_{D8} respectively on the calculations portion of the data sheet.

101. Perform the calculations indicated in Column (ww) of the calculations portion of the data sheet.

102. Repeat steps 18 through 22 for the SXT StLOS.

103. Repeat steps 15 through 22 for the SXT StLOS until eight values of A_{M8} and A_{D8} are obtained.

104. Add the eight rows of Column (ww).

105. Perform the calculation indicated in Columns (xx) and (yy) of the calculations portion of the data sheet.

106. Record the 2X TRUNNION CDU indication.

107. Enter the resultant of Column (yy) and 40.0 degrees in Column (zz) of the calculations portion of the data sheet (enter the larger of the two in Row 4) and subtract Row 5 from Row 4. Enter resultant as Item 107 on the data sheet. (The sign of the resultant is minus if 40.0 degrees is entered in Row 4 and plus if in Row 5.)

108. Using the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROLS on the REMOTE OPTICS CONTROLLER, drive the SXT until the DSKY trunnion display indicates +25000 (±00003).

109. Repeat steps 13 and 14 for the SXT StLOS.

110. Repeat steps 15 and 16 for the SXT StLOS and record as A_{M9} and A_{D9} respectively on the calculations portion of the data sheet.

111. Perform the calculations indicated in Column (C) of the calculations portion of the data sheet.

112. Repeat steps 18 through 22 for the SXT StLOS.

113. Repeat steps 15 through 22 for the SXT StLOS until eight values of A_{M9} and A_{D9} are obtained.

114. Add the eight rows of Column (C).

115. Perform the calculation indicated in Columns (D) and (E) of the calculations portion of the data sheet.

116. Record the 2X TRUNNION CDU indication.

117. Enter the resultant of Column (E) and 25.0 degrees in Column (F) of the

DATE ________

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calculations portion of the data sheet (enter the larger of the two in Row 4) and subtract Row 5 from Row 4. Enter resultant as Item 117 on the data sheet. (The sign of the resultant is minus if 25.0 degrees is entered in Row 4 and plus if in Row 5.)

118. Using the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROLS on the REMOTE OPTICS CONTROLLER, drive the SXT until the DSKY trunnion display indicates +35000 (±00003).

119. Repeat steps 13 and 14 for the SXT StLOS.

120. Repeat steps 15 and 16 for the SXT StLOS and record as A_{M10} and A_{D10} respectively on the calculations portion of the data sheet.

121. Perform the calculations indicated in Column (I) of the calculations portion of the data sheet.

122. Repeat steps 18 through 22 for the SXT StLOS.

123. Repeat steps 15 through 22 for the SXT StLOS until eight values of A_{M10} and A_{D10} are obtained.

124. Add the eight rows of Column (I).

125. Perform the calculation indicated in Columns (J) and (K) of the calculations portion of the data sheet.

126. Record the 2X TRUNNION CDU indication.

127. Enter the resultant of Column (K) and 35.0 degrees in Column (L) of the calculations portion of the data sheet (enter the larger of the two in Row 4) and subtract Row 5 from Row 4. Enter resultant as Item 127 on the data sheet. (The sign of the resultant is minus if 35.0 degrees is entered in Row 4 and plus if in Row 5.)

128. Using the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROLS on the REMOTE OPTICS CONTROLLER, drive the SXT until the DSKY trunnion display indicates +15000 (±00003).

129. Repeat steps 13 and 14 for the SXT StLOS.

130. Repeat steps 15 and 16 for the SXT StLOS and record as A_{M11} and A_{D11} respectively on the calculations portion of the data sheet.

131. Perform the calculations indicated in Column (O) of the calculations portion of the data sheet.

132. Repeat steps 18 through 22 for the SXT StLOS.

133. Repeat steps 15 through 22 for the SXT StLOS until eight values of A_{M11} and A_{D11} are obtained.

134. Add the eight rows of Column (O).

135. Perform the calculation indicated in Columns (P) and (Q) of the calculations portion of the data sheet.

DATE ________

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY | JDC 10099 REV - PAGE 9 OF 9

SUBSYSTEM G & N SYSTEM | ASSY

136. Record the 2X TRUNNION CDU indication.

137. Enter the resultant of Column (Q) and 15.0 degrees in Column (R) of the calculations portion of the data sheet (enter the larger of the two in Row 4) and subtract Row 5 from Row 4. Enter resultant as Item 137 on the data sheet. (The sign of the resultant is minus if 15.0 degrees is entered in Row 4 and plus if in Row 5.)

138. Using the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROLS on the REMOTE OPTICS CONTROLLER, drive the SXT until the DSKY trunnion display indicates +30000 (±00003).

139. Repeat steps 13 and 14 for the SXT StLOS.

140. Repeat steps 15 and 16 for the SXT StLOS and record as A_{M12} and A_{D12} respectively on the calculations portion of the data sheet.

141. Perform the calculations indicated in Column (U) of the calculations portion of the data sheet.

142. Repeat steps 18 through 22 for the SXT StLOS.

143. Repeat steps 15 through 22 for the SXT StLOS until eight values of A_{M12} and A_{D12} are obtained.

144. Add the eight rows of Column (U).

145. Perform the calculation indicated in Columns (V) and (W) of the calculations portion of the data sheet.

146. Record the 2X TRUNNION CDU indication.

147. Enter the resultant of Column (W) and 30.0 degrees in Column (X) of the calculations portion of the data sheet (enter the larger of the two in Row 4) and subtract Row 5 from Row 4. Enter resultant as Item 147 on the data sheet. (The sign of the resultant is minus if 30.0 degrees is entered in Row 4 and plus if in Row 5.)

148. Press the OPTICS POWER ON pushbutton on the TEST CONTROL panel. The pushbutton lamp shall go out. Press the PROCEED/ISS STANDBY pushbutton on the TEST CONTROL PANEL. The pushbutton lamp shall light.

149. Disconnect W87-P4 from W93-P1 and connect W87-P4 to the G & N indicator control panel.

150. Install the G & N indicator control panel on the G & N SYSTEM.

151. Press the PROCEED/ISS OPERATE pushbutton on the TEST CONTROL panel. The pushbutton lamp shall light.

DATE ________

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 16

JDC
NO. 10099
REV. -
INITIAL TDRR ______

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ (START) ______ (END) ______ (SITE / LOCATION)
TIME ______ (START) ______ (END) ______ (TOTAL ELAPSED)

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ (NAME/AFFILIATION) APPROVED BY ______ (NAME/AFFILIATION)

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
36	2X TRUNNION CDU Reading	degrees	-0.010		+0.010		
37	$\lvert A_T-A_T$ (actual)$\rvert$ (0°)	seconds	-40.0		+40.0		
46	2X TRUNNION CDU Reading	degrees	+19.990		+20.010		
47	$\lvert A_{T1}-A_{T1}$ (actual)$\rvert$ (10°)	seconds	-40.0		+40.0		
56	2X TRUNNION CDU Reading	degrees	+113.990		+114.010		
57	$\lvert A_{T2}-A_{T2}$ (actual)$\rvert$ (57°)	seconds	-40.0		+40.0		
66	2X TRUNNION CDU Reading	degrees	+9.990		+10.010		
67	$\lvert A_{T3}-A_{T3}$ (actual)$\rvert$ (5°)	seconds	-40.0		+40.0		

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
76	2X TRUNNION CDU Reading	degrees	+105.990		+106.010		
77	$\lvert A_{T4}-A_{T4}$ (actual)$\rvert$ (53°)	seconds	-40.0		+40.0		
86	2X TRUNNION CDU Reading	degrees	+99.990		+100.010		
87	$\lvert A_{T5}-A_{T5}$ (actual)$\rvert$ (50°)	seconds	-40.0		+40.0		
96	2X TRUNNION CDU Reading	degrees	+39.990		+41.010		
97	$\lvert A_{T6}-A_{T6}$ (actual)$\rvert$ (20°)	seconds	-40.0		+40.0		
106	2X TRUNNION CDU Reading	degrees	+79.990		+80.010		
107	$\lvert A_{T7}-A_{T7}$ (actual)$\rvert$ (40°)	seconds	-40.0		+40.0		
116	2X TRUNNION CDU Reading	degrees	+49.990		+50.010		
117	$\lvert A_{T8}-A_{T8}$ (actual)$\rvert$ (25°)	seconds	-40.0		+40.0		
126	2X TRUNNION CDU Reading	degrees	+69.990		+70.010		
127	$\lvert A_{T9}-A_{T9}$ (actual)$\rvert$ (35°)	seconds	-40.0		+40.0		

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
136	2X TRUNNION CDU Reading	degrees	+29.990		+30.010		
137	$\lvert A_{T10}-A_{T10}$ (actual)$\rvert$ (15°)	seconds	-40.0		+40.0		
146	2X TRUNNION CDU Reading	degrees	+59.990		+60.010		
147	$\lvert A_{T11}-A_{T11}$ (actual)$\rvert$ (30°)	seconds	-40.0		+40.0		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY

CALCULATIONS:

(a)				(b)			
A_N				A_D			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds

	(c)			
	$\|(a) - (b)\|$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(d)			
TOTAL (c)/8 = $\|A_R\|$			
Degrees	Minutes	Seconds	10th's of Seconds

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY

CALCULATIONS:

(e)				(f)			
A_{N1}				A_{D1}			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds

	(g)			
	$\|(e) - (f)\|$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(h)			
TOTAL (g)/8 = $\|A_C\|$			
Degrees	Minutes	Seconds	10th's of Seconds

(i)			
$\|(d) - (h)\| = \|A_T\|$			
Degrees	Minutes	Seconds	10th's of Seconds

(j)			
$\|A_T - A_T$ (actual)$\|0°$			
Degrees	Minutes	Seconds	10th's of Seconds

DIFF.	
SIGN	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY

CALCULATIONS:

(k)				(l)			
A_{N2}				A_{D2}			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds

	(m)			
	$\|(k) - (l)\|$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(n)			
TOTAL (m)/8 = A_{C1}			
Degrees	Minutes	Seconds	10th's of Seconds

(o)			
$\|(d) - (n)\| = \|A_{T1}\|$			
Degrees	Minutes	Seconds	10th's of Seconds

(p)			
$\|A_{T1} - A_{T1}$ (actual)$\|$ 10°			
Degrees	Minutes	Seconds	10th's of Seconds

DIFF.	
SIGN	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY

CALCULATIONS:

(q)				(r)			
A_{N3}				A_{D3}			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds

	(s)			
	$\|(q) - (r)\|$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(t)			
TOTAL (s)/8 = A_{C2}			
Degrees	Minutes	Seconds	10th's of Seconds

(u)			
$\|(d) - (t)\| = \|A_{T2}\|$			
Degrees	Minutes	Seconds	10th's of Seconds

(v)			
$\|A_{T2} - A_{T2}$ (actual)$\|$ 57°			
Degrees	Minutes	Seconds	10th's of Seconds

DIFF.	
SIGN	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY

CALCULATIONS:

(w)				(x)			
A_{H4}				A_{D4}			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds

	(y)			
	$\lvert (w) - (x) \rvert$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(z)			
TOTAL (y)/8 = $\lvert A_{C3} \rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(aa)			
$\lvert (d) - (z) \rvert = \lvert A_{T3} \rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(bb)			
$\lvert A_{T3} - A_{T3}$ (actual)$\rvert$ 5°			
Degrees	Minutes	Seconds	10th's of Seconds

DIFF.	
SIGN	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY

CALCULATIONS:

(cc)				(dd)			
A_{H5}				A_{D5}			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds

	(ee)			
	$\lvert (cc) - (dd) \rvert$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(ff)			
TOTAL (ee)/8 = $\lvert A_{C4} \rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(gg)			
$\lvert (d) - (ff) \rvert = \lvert A_{T4} \rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(hh)			
$\lvert A_{T4} - A_{T4}$ (actual)$\rvert$ 53°			
Degrees	Minutes	Seconds	10th's of Seconds

DIFF.	
SIGN	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY

CALCULATIONS:

(ii)				(jj)			
A_{H6}				A_{D6}			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds

	(kk)			
	$\lvert (ii) - (jj) \rvert$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(ll)			
TOTAL (kk)/8 = $\lvert A_{C5} \rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(mm)			
$\lvert (d) - (ll) \rvert = \lvert A_{T5} \rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(nn)			
$\lvert A_{T5} - A_{T5}$ (actual)$\rvert$ 50°			
Degrees	Minutes	Seconds	10th's of Seconds

DIFF.	
SIGN	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY

CALCULATIONS:

(oo)				(pp)			
A_{H7}				A_{D7}			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds

	(qq)			
	$\lvert (oo) - (pp) \rvert$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(rr)			
TOTAL (qq)/8 = $\lvert A_{C6} \rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(ss)			
$\lvert (d) - (rr) \rvert = \lvert A_{T6} \rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(tt)			
$\lvert A_{T6} - A_{T6}$ (actual)$\rvert$ 20°			
Degrees	Minutes	Seconds	10th's of Seconds

DIFF.	
SIGN	

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY
CALCULATIONS:

(uu)				(vv)			
A_{N8}				A_{D8}			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds

	(ww)			
	$\lvert(uu) - (vv)\rvert$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(xx)			
TOTAL (ww)/8 = $\lvert A_{C7}\rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(yy)			
$\lvert(d) - (xx)\rvert = \lvert A_{T7}\rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(zz)			
$\lvert A_{T7} - A_{T7}$ (actual)$\rvert$ 40°			
Degrees	Minutes	Seconds	10th's of Seconds

DIFF.	
SIGN	

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY
CALCULATIONS:

(A)				(B)			
A_{N9}				A_{D9}			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds

	(C)			
	$\lvert(A) - (B)\rvert$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(D)			
TOTAL (C)/8 = $\lvert A_{C8}\rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(E)			
$\lvert(d) - (D)\rvert = \lvert A_{T8}\rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(F)			
$\lvert A_{T8} - A_{T8}$ (actual)$\rvert$ 25°			
Degrees	Minutes	Seconds	10th's of Seconds

DIFF.	
SIGN	

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 14 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY
CALCULATIONS:

(G)				(H)			
A_{N10}				A_{D10}			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds

	(I)			
	$\lvert(G) - (H)\rvert$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(J)			
TOTAL (I)/8 = $\lvert A_{C9}\rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(K)			
$\lvert(d) - (J)\rvert = \lvert A_{C9}\rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(L)			
$\lvert A_{T9} - A_{T9}$ (actual)$\rvert$ 35°			
Degrees	Minutes	Seconds	10th's of Seconds

DIFF.	
SIGN	

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 15 OF 16

JDC
NO. 10099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY
CALCULATIONS:

(M)				(N)			
A_{N11}				A_{D11}			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds

	(O)			
	$\lvert(M) - (N)\rvert$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(P)			
TOTAL (O)/8 = $\lvert A_{C10}\rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(Q)			
$\lvert(d) - (P)\rvert = \lvert A_{T10}\rvert$			
Degrees	Minutes	Seconds	10th's of Seconds

(R)			
$\lvert A_{T10} - A_{11}$ (actual)$\rvert$ 15°			
Degrees	Minutes	Seconds	10th's of Seconds

DIFF.	
SIGN	

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 16 OF 16

JDC
NO. 1(099
REV. -

JOB ALTERNATE TEST FOR TRUNNION POSITIONAL ACCURACY

CALCULATIONS:

(S)				(T)			
A_{M12}				A_{D12}			
Degrees	Minutes	Seconds	10th's of Seconds	Degrees	Minutes	Seconds	10th's of Seconds
			^				

	(U)			
	$\|(S) - (T)\|$			
	Degrees	Minutes	Seconds	10th's of Seconds
TOTAL				

(V)			
TOTAL (U)/8 = $\|A_{C11}\|$			
Degrees	Minutes	Seconds	10th's of Seconds

(W)			
$\|(d) - (V)\| = \|A_{T11}\|$			
Degrees	Minutes	Seconds	10th's of Seconds

(X)			
$\|A_{T11} - A_{T11}$ (actual)$\|$ 30°			
Degrees	Minutes	Seconds	10th's of Seconds

	DIFF.
SIGN	

DATE ______

This JDC includes 1 data sheet.

JOB:

INITIAL TDRR: 06721 3/3/64
JDC: 10101 REV: PAGE 1 OF 2

SUBSYSTEM:

ASSY:

DESCRIPTION:

TYPE:
INTERVAL:

TOOLS AND
MATERIAL:

REFERENCES:

IMPORTANT:

Rev Let	Date	TDRR No	Pages Revised		Approval	
			JDC	DS	MIT	NASA

TP# 8365

JDC REV DATE

Page 2 Of 2.

JOB: PREFUNCTIONAL CHECK

JDC 10101

SUBSYSTEM: OPTICAL SUBSYSTEM

ASSEMBLY: 1015100

DESCRIPTION: Visual inspection for damage or breakage.

TYPE: Check
INTERVAL:

TOOLS AND
MATERIAL: Data Sheet Form JDC-D-10101

REFERENCES:
ATP 1015100
Paragraph 1-2, 3-1, 3-2.3

IMPORTANT: None

A. PREPARATION

1. Assemble components per ATP 1015100 paragraph 1-2 and test equipment per ATP 1015100 paragraph 3-2.3.

B. PROCEDURE

1. Insure that G&N System Optical Subsystem has been constructed and finished in a high quality workmanship manner. Record on data sheet.
2. Verify that quantity of hardware is complete and proper. Record on data sheet.
3. Verify that drawing numbers, serial numbers, and other markings are correct and legible. Record on data sheet.
4. Insure that all previous operations have been completed, the assembly inspection tags have been stamped, and all seals where applicable are intact. Record on data sheet.
5. Visually inspect the G&N System Optical Subsystem for presence of dust, gear damage, paint damage, broken glass, damaged wires, bent pins and/ or other physical damage without separation or disassembly of assemblies. Record on data sheet.
6. Insure that calibration of test equipment is certified and expiration dates have not been exceeded.

JOB: PREFUNCTIONAL CHECK

JDC-D- 10101 **REV**
SHEET 1 **OF** 1

SUBSYSTEM: OPTICAL SUBSYSTEM

DESCRIPTION: Visual inspection for damage or breakage

G AND N SYSTEM NO.

DATE OF TEST:

REFERENCES: ATP 1015100 Para. 1-2, 3-1, 3-2.3

OPERATOR:

ITEM		REJ	ACC
B-1	The Optical Subsystem has been constructed and finished in a manner indicating high quality workmanship.	—	—
B-2	The quantity of hardware is complete and proper.	—	—
B-3	The drawing numbers, serial numbers, and other markings are correct and legible.	—	—
B-4	Insure that all previous operations have been completed, the assembly inspection tags have been stamped, and all seals where applicable are intact.	—	—
B-5	Visually insure, without separation or disassembly of assemblies, that there does not exist: 1) dust, 2) gear damage, 3) paint damage, 4) broken glass, 5) damaged wires, 6) bent pins and/or 7) other physical damage.	—	—
B-6	Calibration of test equipment certified and expiration dates not exceeded.	—	—

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

JOB ALIGNMENT OF OSS OPTICAL TARGETS

JDC 10181 **REV.** A **PAGE** 1 **OF** 3

INITIAL TDRR 10790 **D.S. PGS** -

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION Procedure for alignment of optical target autocollimators of 0° Autocollimator Assembly for OSS testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	90d-1	13355	1,2,3		WR	

REFERENCES ATP 1015100, Para. 5.2

IMPORTANT JDC 10180 shall have been performed.

INTERVAL

TOOLS AND MATERIAL See below.

TOOLS AND MATERIAL: 0° Autocollimator Assembly PN 1017380, Vertical Leveling Mirror PN 1017445, Retroreflecting Prism PN 1019840, Sextant Alignment Bar (See figure 1), 1/4-inch dia. cap screws (two)

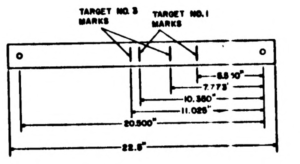
A. PREPARATION

1. Place the 0° Autocollimator Assembly on OSS pier such that the autocollimators are pointing north. Insert and engage the three holding screws and flat washers.

3, ~~2~~. Set the rotary axis of the Rotary Table to approximately 330°.

2, ~~3~~. Set the tilt axis of the Rotary Table to approximately 0°.

4. Remove Bellows Guard from Optics/NB Mtg. Fixture. Retain the two cap screws and flat washers.



13166A

Figure 1. Sextant Alignment Bar

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE ______

JOB ALIGNMENT OF OSS OPTICAL TARGETS

JDC 10181 **REV** A **PAGE** 2 **OF** 3

SUBSYSTEM OPTICAL

ASSY

5. Remove the two upper kinematic mounting pads from the mounting fixture. Retain the two cap screws and washers from each pad.

6. Position the Sextant Alignment Bar on the surfaces from which the kinematic mounting pads were removed with the scribe marks facing the OSS pier and the TARGET No. 1 scribe marks to the east of the TARGET No. 3 scribe marks. Fasten the Sextant Alignment Bar to the central holes of the mounting pad surface with two 1/4-inch diameter cap screws.

7. Set the micrometer drums on both target autocollimators to 10 minutes 0 seconds. Set the azimuth and elevation adjust knobs to mid-range.

8. Set the cradle adjustment knob on the Optics/NB Mtg. Fixture to mid-range.

9. Energize the reticle lamps of both targets.

B. PROCEDURE

NOTE: Optical targets are defined as follows:

TARGET No. 1: 5-inch autocollimator, part number 1017410

TARGET No. 2: 2-1/2-inch autocollimator, part number 1017435

1. Align the 0° Autocollimator Assembly laterally by aligning TARGET No. 1 to the Sextant Alignment Bar Target no. 1 scribe marks as follows:

NOTE: Use the eyepiece from TARGET No. 2 as the auxiliary eyepiece.

a. Hold the auxiliary eyepiece over TARGET No. 1 eyepiece and focus the auxiliary eyepiece on the Sextant Alignment Bar.

b. Position the 0° Autocollimator Assembly laterally until the two Target no. 1 scribe marks on the Sextant Alignment Bar are positioned at equal distances from the edges of the autocollimator objective lens as viewed through the auxiliary eyepiece.

c. Tighten the 0° Autocollimator Assembly holding screws.

2. Place the Vertical Leveling Mirror (VLM) on the target plate directly in front of TARGET No. 1.

3. Position the VLM in azimuth until the reflected reticle pattern can be seen through the TARGET No. 1 eyepiece.

4. Level and unlock the VLM. Allow one minute for the VLM to come to rest.

5. Using the elevation adjust knob, adjust TARGET No. 1 until the reflected reticle pattern is centered on the elevation filar.

6. Lock the VLM and position it on the target plate directly in front of TARGET No. 2.

7. Position the VLM in azimuth until the reflected reticle pattern can be seen through the TARGET No. 2 eyepiece.

8. Level and unlock the VLM. Allow one

DATE ______

JOB ALIGNMENT OF OSS OPTICAL TARGETS

JDC 10181 **REV** A **PAGE** 3 **OF** 3

SUBSYSTEM OPTICAL

ASSY

minute for the VLM to come to rest.

9. Using the elevation adjust knob, adjust TARGET No. 2 until the reflected reticle pattern is centered on the elevation filar.

10. Lock and remove the VLM.

11. Position the Retroreflecting Prism directly in front of the targets so that the front plate is approximately normal to the target lines-of-sight, centered on and facing the two target objective lenses.

12. Adjust the azimuth adjust knob of TARGET No. 2 until the projected reticle pattern of TARGET No. 1 is centered on the azimuth filar as viewed through the TARGET No. 2 eyepiece.

13. Remove the Retroreflecting Prism and the Sextant Alignment Bar.

NOTE: If JDC 10182 is to be performed immediately after this JDC, omit steps B.14 and B.15. Also omit steps A.1 and A.2 of JDC 10182 and retain kinematic mounting pad and Bellows Guard hardware for use in that JDC.

14. Reinstall the two upper kinematic mounting pads to the mounting fixture with the two cap screws and flat washers from each pad.

15. Reinstall the Bellows Guard to the mounting fixture with the two cap screws and flat washers.

DATE ______

Released with ATP 1015100

JOB ALIGNMENT OF OSS OPTICAL TARGETS

JDC 10181 **REV.** B **PAGE** 1 **OF** 3
INITIAL TDRR 10790 **D.S. PGS** -

SUBSYSTEM OPTICAL
ASSY.

DESCRIPTION Procedure for alignment of optical target autocollimators of 0° Autocollimator Assembly for OSS testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-10-64	13355	1-3	–	W. K.	J. B.
B	6-28-65	20520	1	–	W. K.	T. M.

REFERENCES ATP 1015100, Para. 5-2
ATP 1010191, Para. 5-2
ATP 1009502, Para. 5-2

IMPORTANT JDC 10180 shall have been performed.

INTERVAL

TOOLS AND MATERIAL See below.

TOOLS AND MATERIAL: 0° Autocollimator Assembly PN 1017380, Vertical Leveling Mirror PN 1017445, Retroreflecting Prism PN 1019840, Sextant Alignment Bar (See figure 1), 1/4-inch dia. cap screws (two)

A. PREPARATION

1. Place the 0° Autocollimator Assembly on OSS pier such that the autocollimators are pointing north. Insert and engage the three holding screws and flat washers.
2. Set the tilt axis of the Rotary Table to approximately 0°.
3. Set the rotary axis of the Rotary Table to approximately 330°.
4. Remove Bellows Guard from Optics/NB Mtg. Fixture. Retain the two cap screws and flat washers.

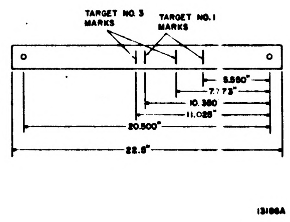


Figure 1. Sextant Alignment Bar

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB ALIGNMENT OF OSS OPTICAL TARGETS

JDC 10181 **REV** B **PAGE** 2 **OF** 3

SUBSYSTEM OPTICAL
ASSY

5. Remove the two upper kinematic mounting pads from the mounting fixture. Retain the two cap screws and washers from each pad.
6. Position the Sextant Alignment Bar on the surfaces from which the kinematic mounting pads were removed with the scribe marks facing the OSS pier and the TARGET No. 1 scribe marks to the east of the TARGET No. 3 scribe marks. Fasten the Sextant Alignment Bar to the central holes of the mounting pad surface with two 1/4-inch diameter cap screws.
7. Set the micrometer drums on both target autocollimators to 10 minutes 0 seconds. Set the azimuth and elevation adjust knobs to mid-range.
8. Set the cradle adjustment knob on the Optics/NB Mtg. Fixture to mid-range.
9. Energize the reticle lamps of both targets.

B. PROCEDURE

NOTE: Optical targets are defined as follows:
TARGET No. 1: 5-inch autocollimator, part number 1017410
TARGET No. 2: 2-1/2-inch autocollimator, part number 1017435

1. Align the 0° Autocollimator Assembly laterally by aligning TARGET No. 1 to the Sextant Alignment Bar Target no. 1 scribe marks as follows:

NOTE: Use the eyepiece from TARGET No. 2 as the auxiliary eyepiece.

a. Hold the auxiliary eyepiece over TARGET No. 1 eyepiece and focus the auxiliary eyepiece on the Sextant Alignment Bar.
b. Position the 0° Autocollimator Assembly laterally until the two Target no. 1 scribe marks on the Sextant Alignment Bar are positioned at equal distances from the edges of the autocollimator objective lens as viewed through the auxiliary eyepiece.
c. Tighten the 0° Autocollimator Assembly holding screws.

2. Place the Vertical Leveling Mirror (VLM) on the target plate directly in front of TARGET No. 1.
3. Position the VLM in azimuth until the reflected reticle pattern can be seen through the TARGET No. 1 eyepiece.
4. Level and unlock the VLM. Allow one minute for the VLM to come to rest.
5. Using the elevation adjust knob, adjust TARGET No. 1 until the reflected reticle pattern is centered on the elevation filar.
6. Lock the VLM and position it on the target plate directly in front of TARGET No. 2.
7. Position the VLM in azimuth until the reflected reticle pattern can be seen through the TARGET No. 2 eyepiece.
8. Level and unlock the VLM. Allow one

DATE ______

JOB ALIGNMENT OF OSS OPTICAL TARGETS

JDC 10181 **REV** B **PAGE** 3 **OF** 3

SUBSYSTEM OPTICAL
ASSY

minute for the VLM to come to rest.
9. Using the elevation adjust knob, adjust TARGET No. 2 until the reflected reticle pattern is centered on the elevation filar.
10. Lock and remove the VLM.
11. Position the Retroreflecting Prism directly in front of the targets so that the front plate is approximately normal to the target lines-of-sight, centered on and facing the two target objective lenses.
12. Adjust the azimuth adjust knob of TARGET No. 2 until the projected reticle pattern of TARGET No. 1 is centered on the azimuth filar as viewed through the TARGET No. 2 eyepiece.
13. Remove the Retroreflecting Prism and the Sextant Alignment Bar.

NOTE: If JDC 10182 is to be performed immediately after this JDC, omit steps B.14 and B.15. Also omit steps A.1 and A.2 of JDC 10182 and retain kinematic mounting pad and Bellows Guard hardware for use in that JDC.

14. Reinstall the two upper kinematic mounting pads to the mounting fixture with the two cap screws and flat washers from each pad.
15. Reinstall the Bellows Guard to the mounting fixture with the two cap screws and flat washers.

DATE ______

Released with ATP 1015100

JOB ALIGNMENT OF OSS OPTICAL TARGETS

JDC 10181 **REV.** C **PAGE** 1 **OF** 3

INITIAL TDRR 10790 **D.S. PGS** -

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION Procedure for alignment of optical target autocollimators of 0° Autocollimator Assembly for OSS testing.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-10-64	13355	1-3	–	W. K.	J. B.
B	6-28-65	20520	1	–	W. K.	T. M.
C	4-29-68	36126	1	-	EA BD	-

REFERENCES ATP 1015100, ATP 1010191, ATP 1009502, ATP 2015500

IMPORTANT JDC 10180 shall have been performed.

INTERVAL

TOOLS AND MATERIAL See below.

TOOLS AND MATERIAL: 0° Autocollimator Assembly PN 1017380, Vertical Leveling Mirror PN 1017445, Retroreflecting Prism PN 1019840, Sextant Alignment Bar (See figure 1), 1/4-inch dia. cap screws (two)

A. PREPARATION

1. Place the 0° Autocollimator Assembly on OSS pier such that the autocollimators are pointing north. Insert and engage the three holding screws and flat washers.
2. Set the tilt axis of the Rotary Table to approximately 0°.
3. Set the rotary axis of the Rotary Table to approximately 330°.
4. Remove Bellows Guard from Optics/NB Mtg. Fixture. Retain the two cap screws and flat washers.

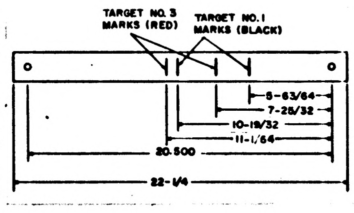


Figure 1. Sextant Alignment Bar

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB ALIGNMENT OF OSS OPTICAL TARGETS

JDC 10181 **REV** C **PAGE** 2 **OF** 3

SUBSYSTEM OPTICAL

ASSY

5. Remove the two upper kinematic mounting pads from the mounting fixture. Retain the two cap screws and washers from each pad.
6. Position the Sextant Alignment Bar on the surfaces from which the kinematic mounting pads were removed with the scribe marks facing the OSS pier and the TARGET No. 1 scribe marks to the east of the TARGET No. 3 scribe marks. Fasten the Sextant Alignment Bar to the central holes of the mounting pad surface with two 1/4-inch diameter cap screws.
7. Set the micrometer drums on both target autocollimators to 10 minutes 0 seconds. Set the azimuth and elevation adjust knobs to mid-range.
8. Set the cradle adjustment knob on the Optics/NB Mtg. Fixture to mid-range.
9. Energize the reticle lamps of both targets.

B. PROCEDURE

NOTE: Optical targets are defined as follows:

TARGET No. 1: 5-inch autocollimator, part number 1017410

TARGET No. 2: 2-1/2-inch autocollimator, part number 1017435

1. Align the 0° Autocollimator Assembly laterally by aligning TARGET No. 1 to the Sextant Alignment Bar Target no. 1 scribe marks as follows:

NOTE: Use the eyepiece from TARGET No. 2 as the auxiliary eyepiece.

a. Hold the auxiliary eyepiece over TARGET No. 1 eyepiece and focus the auxiliary eyepiece on the Sextant Alignment Bar.
b. Position the 0° Autocollimator Assembly laterally until the two Target no. 1 scribe marks on the Sextant Alignment Bar are positioned at equal distances from the edges of the autocollimator objective lens as viewed through the auxiliary eyepiece.
c. Tighten the 0° Autocollimator Assembly holding screws.

2. Place the Vertical Leveling Mirror (VLM) on the target plate directly in front of TARGET No. 1.
3. Position the VLM in azimuth until the reflected reticle pattern can be seen through the TARGET No. 1 eyepiece.
4. Level and unlock the VLM. Allow one minute for the VLM to come to rest.
5. Using the elevation adjust knob, adjust TARGET No. 1 until the reflected reticle pattern is centered on the elevation filar.
6. Lock the VLM and position it on the target plate directly in front of TARGET No. 2.
7. Position the VLM in azimuth until the reflected reticle pattern can be seen through the TARGET No. 2 eyepiece.
8. Level and unlock the VLM. Allow one

DATE ______

JOB ALIGNMENT OF OSS OPTICAL TARGETS

JDC 10181 **REV** C **PAGE** 3 **OF** 3

SUBSYSTEM OPTICAL

ASSY

minute for the VLM to come to rest.

9. Using the elevation adjust knob, adjust TARGET No. 2 until the reflected reticle pattern is centered on the elevation filar.
10. Lock and remove the VLM.
11. Position the Retroreflecting Prism directly in front of the targets so that the front plate is approximately normal to the target lines-of-sight, centered on and facing the two target objective lenses.
12. Adjust the azimuth adjust knob of TARGET No. 2 until the projected reticle pattern of TARGET No. 1 is centered on the azimuth filar as viewed through the TARGET No. 2 eyepiece.
13. Remove the Retroreflecting Prism and the Sextant Alignment Bar.

NOTE: If JDC 10182 is to be performed immediately after this JDC, omit steps B.14 and B.15. Also omit steps A.1 and A.2 of JDC 10182 and retain kinematic mounting pad and Bellows Guard hardware for use in that JDC.

14. Reinstall the two upper kinematic mounting pads to the mounting fixture with the two cap screws and flat washers from each pad.
15. Reinstall the Bellows Guard to the mounting fixture with the two cap screws and flat washers.

DATE ______

JOB INSTALLATION OF NAVIGATION BASE AND OPTICAL UNIT ASSEMBLY ON OPTICS/NB MTG FIXTURE

JDC 10182 **REV.** A **PAGE** 1 **OF** 2
INITIAL TDRR 10790 **D.S. PGS** -

SUBSYSTEM OPTICAL
ASSY.

DESCRIPTION Procedure for installation of Navigation Base and Optical Unit Assembly (1899950) on Optics/NB. Mtg. Fixture (1900013-011).

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9Oct64	13354	1,2		WP	

REFERENCES ATP 1015100, Paragraph 2

IMPORTANT JDC's 10101, 10181, and 10186 shall have been performed.

INTERVAL

TOOLS AND MATERIAL Torque Wrench

A. PROCEDURE

1. Remove Bellows Guard from Optics/NB Mtg. Fixture and retain the 2 cap screws and flat washers for use in step A.15.
2. Remove the two mounting pads, located in the upper left- and right-hand portions, from the mounting fixture and retain attaching hardware for use in step A.13.
3. Assure the mounting pads are assembled as illustrated.

   NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

4. Tighten the adjusting screw on both mounting pads as follows:
   a. Assure that the Belleville washers are centered.
   b. Tighten adjusting screw until washers are completely compressed.
   c. Loosen adjusting screw 1/8 turn.
5. Install mounting pads, obtained in step A.2, on the Navigation Base using captive screws in Navigation Base such that when the Navigation Base is mounted on the fixture the alignment marks on the pads will line up with the alignment marks on the fixture. Tighten mounting bolts, in increments of 50 pound-inches, to a torque of 260 (±10) pound-inches.
6. Remove the lower mounting pad from the mounting fixture and retain attaching hardware for use in step A.15.
7. Assure the lower mounting pad is assembled.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB INSTALLATION OF NAVIGATION BASE AND OPTICAL UNIT ASSEMBLY ON OPTICS/NB MTG FIXTURE

JDC 10182 **REV** A **PAGE** 2 **OF** 2

SUBSYSTEM OPTICAL
ASSY

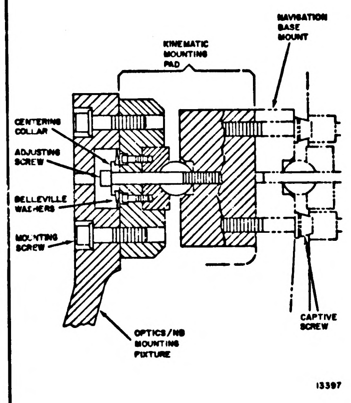
8. Assure the Belleville washers on the lower pad are centered on each other and tighten adjusting screw until both halves of the mounting pad are snug but can be adjusted.
9. Install mounting pad obtained in step A.6 on Navigation Base using hardware provided on mounting pad. Torque bolts in increments of approximately 50 pound-inches to a torque of 260 (±10) pound-inches.
10. Set the rotary axis of the Rotary Table to approximately 330°.
11. Set the tilt axis of the Rotary Table to approximately 90°.

    NOTE: While performing step A.12, care must be exercised to avoid any strain to the optics bellows and to avoid scratching the Navigation Base and Optical Unit.

12. Lift the Navigation Base and Optical Unit and carefully position on the Optics/NB Mtg. Fixture, insuring that the alignment marks on the mounting pads line up with those on the fixture and that the alignment pins mate.
13. Fasten the 3 mounting pads to the fixture using the hardware retained in steps A.2 and A.6. Tighten the screws on the mounting pads, in increments of 50 pound-inches, to a torque of 260 (±10) pound-inches.
14. Tighten adjusting screw on lower mounting pad as follows:
    a. Assure that the Belleville washers are centered.
    b. Tighten adjusting screw until washers are completely compressed.
    c. Loosen adjusting screw 1/8 turn.
15. Fasten the Bellows Guard to the fixture, using the cap screws and washers retained in step A.1. Tighten screws down snug.

    NOTE: Do not overtighten screws in step A.16.

16. Fasten the Bellows Guard to the Optical Unit with the 6 screws provided. Tighten screws down snug.



Installation of Upper Mounting Pads
(Cross-Sectional View)

DATE ______

Released with ATP 1015100

JOB INSTALLATION OF NAVIGATION BASE AND OPTICAL UNIT ASSEMBLY ON OPTICS/NB MTG FIXTURE

JDC 10182 REV. B PAGE 1 OF 2
INITIAL TDRR 10790 D.S. PGS -

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION Procedure for installation of Navigation Base and Optical Unit Assembly (1899950) on Optics/NB. Mtg. Fixture (1900013-011).

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-10-64	13354	1-2	—	W. K.	J. B.
B	2-9-65	16379	1	-	W. K.	T. M.

REFERENCES ATP 1015100, Paragraph 2 or ATP 1010 91, Paragraph 2

IMPORTANT JDC's 10101 and 10181 or JDC's 10601 and 10181 shall have been performed.

INTERVAL

TOOLS AND MATERIAL Torque Wrench

A. PROCEDURE

1. Remove Bellows Guard from Optics/NB Mtg. Fixture and retain the 2 cap screws and flat washers for use in step A. 15.

2. Remove the two mounting pads, located in the upper left- and right-hand portions, from the mounting fixture and retain attaching hardware for use in step A. 13.

3. Assure the mounting pads are assembled as illustrated.

NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

4. Tighten the adjusting screw on both mounting pads as follows:

a. Assure that the Belleville washers are centered.

b. Tighten adjusting screw until washers are completely compressed.

c. Loosen adjusting screw 1/8 turn.

5. Install mounting pads, obtained in step A. 2, on the Navigation Base using captive screws in Navigation Base such that when the Navigation Base is mounted on the fixture the alignment marks on the pads will line up with the alignment marks on the fixture. Tighten mounting bolts, in increments of 50 pound-inches, to a torque of 260 (±10) pound-inches.

6. Remove the lower mounting pad from the mounting fixture and retain attaching hardware for use in step A. 13.

7. Assure the lower mounting pad is assembled.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ________

JOB INSTALLATION OF NAVIGATION BASE AND OPTICAL UNIT ASSEMBLY ON OPTICS/NB MTG FIXTURE

JDC 10182 REV B PAGE 2 OF 2

SUBSYSTEM OPTICAL

ASSY

8. Assure the Belleville washers on the lower pad are centered on each other and tighten adjusting screw until both halves of the mounting pad are snug but can be adjusted.

9. Install mounting pad obtained in step A. 6 on Navigation Base using hardware provided on mounting pad. Torque bolts in increments of approximately 50 pound-inches to a torque of 260 (±10) pound-inches.

10. Set the rotary axis of the Rotary Table to approximately 330°.

11. Set the tilt axis of the Rotary Table to approximately 90°.

NOTE: While performing step A. 12, care must be exercised to avoid any strain to the optics bellows and to avoid scratching the Navigation Base and Optical Unit.

12. Lift the Navigation Base and Optical Unit and carefully position on the Optics/NB Mtg. Fixture, insuring that the alignment marks on the mounting pads line up with those on the fixture and that the alignment pins mate.

13. Fasten the 3 mounting pads to the fixture using the hardware retained in steps A. 2 and A. 6. Tighten the screws on the mounting pads, in increments of 50 pound-inches, to a torque of 260 (±10) pound-inches.

14. Tighten adjusting screw on lower mounting pad as follows:

a. Assure that the Belleville washers are centered.

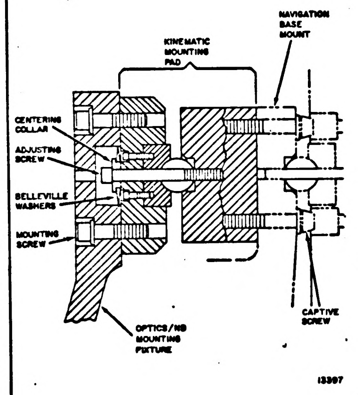
b. Tighten adjusting screw until washers are completely compressed.

c. Loosen adjusting screw 1/8 turn.

15. Fasten the Bellows Guard to the fixture, using the cap screws and washers retained in step A. 1. Tighten screws down snug.

NOTE: Do not overtighten screws in step A. 16.

16. Fasten the Bellows Guard to the Optical Unit with the 6 screws provided. Tighten screws down snug.



Installation of Upper Mounting Pads
(Cross-Sectional View)

DATE ________

Released with ATP 1015100

JOB INSTALLATION OF NAVIGATION BASE AND OPTICAL UNIT ASSEMBLY ON OPTICS/NB MTG FIXTURE	**JDC** 10182 **REV.** C **PAGE** 1 **OF** 2 **INITIAL TDRR** 1079(**D.S. PGS** -
SUBSYSTEM OPTICAL	**ASSY.**

DESCRIPTION Procedure for installation of Navigation Base and Optical Unit Assembly on Optics/NB. Mtg. Fixture.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	9-10-64	13354	1-2	-	WK	JB
B	2-9-65	16379	1	-	WK	TM
C	10-19-65	23228	1-2	-	WW	N/A

REFERENCES
ATP 1015100, Para. 2
ATP 1010191, Para. 2
ATP 1009502, Para. 2

IMPORTANT JDC's 10101 and 10181 or JDC's 10601 and 10181 shall have been performed.

INTERVAL

TOOLS AND MATERIAL Torque Wrench

A. PROCEDURE

1. Remove Bellows Guard from Optics/NB Mtg. Fixture and retain the 2 cap screws and flat washers for use in step A.11.

2. Remove all three mounting pads from the Mounting Fixture and retain attaching hardware for use in step A.9.

3. Assure the mounting pads are assembled as illustrated.

NOTE: A tooling ring or equivalent may be used to center the Belleville washers on each other.

4. Assure the Belleville washers on the mounting pads are centered on each other and tighten adjusting acrew until both halves on the mounting pad are snug but can be adjusted.

5. Install mounting pads, obtained in step A.2, on the Navigation Base using captive screws in Navigation Base such that when the Navigation Base is mounted on the fixture the alignment marks on the pads will line up with the alignment marks on the fixture. Tighten mounting bolts, in increments of 50 pound-inches, to a torque of 260 (±10) pound-inches.

6. Set the rotary axis of the Rotary Table to approximately 330°.

7. Set the tilt axis of the Rotary Table to approximately 90°.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 1 JUL 64

JOB INSTALLATION OF NAVIGATION BASE AND OPTICAL UNIT ASSEMBLY ON OPTICS/NB MTG FIXTURE	**JDC** 10182 **REV** C **PAGE** 2 **OF** 2
SUBSYSTEM OPTICAL	**ASSY**

NOTE: While performing step A.8, care must be exercised to avoid any strain to the optics bellows and to avoid scratching the Navigation Base and Optical Unit.

8. Lift the Navigation Base and Optical Unit and carefully position on the Optics/NB Mtg. fixture, insuring that the alignment marks on the mounting pads line up with those on the fixture and that the alignment pins mate.

9. Fasten the three mounting pads to the Fixture using the hardware retained in Step A.2. Tighten the screws on the mounting pads, in increments of 50 pound-inches, to a torque of 260 (±10) pound-inches.

10. Tighten adjusting screws on mounting pads as follows:

a. Assure that the Belleville washers are centered.

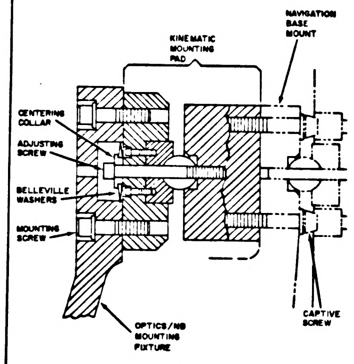
b. Tighten adjusting screw until washers are completely compressed.

c. Loosen adjusting screw 1/8 turn.

11. Fasten the Bellows Guard to the Fixture, using the cap screws and washers retained in Step A.1. Tighten screws down snug.

NOTE: Do not over-tighten screws in Step A.12.

12. Fasten the Bellows Guard to the Optical Unit with the 6 screws provided. Tighten screws down snug.



13397

Installation of Upper Mounting Pads

(Cross-Sectional View)

DATE 1 JUL 64

JOB INSTALLATION OF NAVIGATION BASE AND OPTICAL UNIT ON OPTICS/NB FIXTURE

JDC 10182 **REV.** ____ **PAGE** 1 **OF** 2

INITIAL TDRR 10790 **D.S. PGS** ____

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES

IMPORTANT

JDC's 10101, 10181 and 10186 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

Torque Wrench

A. PROCEDURE

1. Remove Bellows Guard from Optics/NB MTG Fixture and retain the 2 cap screws and flat washers for use in Step 10.

2. Remove the two mounting pads, located in the upper left- and right-hand portions, from the mounting fixture and retain attaching hardware for use in Step 9.

3. Install mounting pads, obtained in Step 2, on the Navigation Base using captive screws in Navigation Base such that when the Navigation Base is mounted on the fixture the alignment marks on the pads will line up with the alignment marks on the fixture. Tighten mounting bolts, in increments of 50 pound-inches, to a torque of 260 (±10) pound-inches.

4. Remove the lower mounting pad from the mounting fixture and retain attaching hardware for use in Step 9.

5. Install mounting pad obtained in Step 4 on Navigation Base using hardware provided on mounting pad. Torque bolts in increments of approximately 50 pound-inches to a torque of 260 (±10) pound-inches.

6. Set the rotary axis of the rotary table to approximately 330°.

7. Set the tilt axis of the rotary table to approximately 90°.

NOTE: While performing Step 8, care must be exercised to avoid any strain to the optics bellows and to avoid scratching the Navigation Base and Optical Unit.

8. Lift the Navigation Base and Optical Unit and carefully position on the Optics/NB MTG Fixture, insuring that the alignment marks on the mounting pads line up with those on the fixture and that the alignment pins mate.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 6/30/64

JOB INSTALLATION OF NAVIGATION BASE AND OPTICAL UNIT ON OPTICS/NB MTG FIXTURE

JDC 10182 **REV** **PAGE** 2 **OF** 2

SUBSYSTEM OPTICAL

ASSY

9. Fasten the 3 mounting pads to the fixture using the hardware retained in Steps 2 and 4. Tighten the screws on the mounting pads, in increments of 50 pound-inches, to a torque of 260 (±10) pound-inches.

10. Fasten the Bellows Guard to the fixture, using the cap screws and washers retained in Step 1. Tighten screws down snug.

NOTE: Do not overtighten screws in Step 11.

11. Fasten the Bellows Guard to the Optical Unit with 6 screws. Tighten screws down snug.

NOTE: Insure that the Optical Unit has been properly purged and filled before performing Step 12.

12. Connect the coolant lines to the Optical Unit and the G and N Coolant and Power Console.

DATE 6/30/64

INCHES
0 1 2
PHOTOGRAPHIC SCALE

Released with ATP 1009502

JDC 10702 REV. A PAGE 1 OF 2
INITIAL TDRR 19950 D.S. PGS 2

JOB POWER CHECK

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION Check power requirements of the optical subsystem.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-1-65	22218	1	-	WK	TM

REFERENCES ATP 1009502 Para. 3-3.1, JDC's 18000, 18020, 18035, 18036, and 18040.

IMPORTANT JDC 10738 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the following pushbuttons on the Test Control panel are lighted:

OIA ON
OPTICS POWER ON
BLOCK I SERIES 100.

NOTE: Assure that the Counter, DVM, and PAVM have been energized at least 15 minutes immediately prior to use in this test.

2. Connect the 28-volt dc power to DVM by setting the Primary Signal Selector to 200.

3. Use the AGE VOLTAGE ADJUST control on the Test Selector Panel to adjust the voltage to 25.0 (-0, +0.25) volts.

4. Assure that the TIMING INHIBIT switch on the Apollo Computer Simulator is set to NORMAL.

B. PROCEDURE

1. Connect the optics encoder excitation to the DVM by setting the Primary Signal Selector to 102.

2. Monitor the DVM to determine and record the optics encoder excitation.

3. Connect the 25.6 KC supply to the Counter by setting the COUNTER INPUT 'D' SIGNAL switch on the Primary Signal Selector panel to 4. Assure that the D SIGNAL indicator is lighted.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB POWER CHECK

JDC 10702 **REV** A **PAGE** 2 **OF** 2

SUBSYSTEM OPTICAL

ASSY

4. Set switches and controls on Counter to perform period function as follows:

SAMPLE TIME (N_1) to 25600
DISPLAY TIME (N_2) to 10^5
DISPLAY RESET to ZERO
CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to RATIO OR PERIOD
INPUT SELECTOR to C SENSE
SENSE SELECTOR to FWD.

5. Adjust D Channel SLOPE, ATTEN, and TRIGGER switch and controls on Counter as required.

6. Monitor the Counter to determine and record the period of the 25.6 KC supply.

7. Connect the 28-volt, 800 cps, 1% supply to the DVM by setting the Primary Signal Selector to 101.

8. Monitor the DVM to determine and record the 28-volt supply voltage.

9. Connect the 28-volt, 800 cps, 1% supply to the PAVM by setting the Primary Signal Selector to 101.

10. Set the FREQUENCY switch on the PAVM to 800~ NO. 1.

11. Monitor the PAVM to determine and record the 28-volt supply phase angle.

12. Set the COUNTER INPUT 'D' SIGNAL switch on the Primary Signal Selector panel to 2.

13. Set the SAMPLE TIME (N_1) controls on the Counter to 800. Monitor the Counter to determine and record the period of the 28-volt, 800 cps, 1%, supply.

14. Connect the 28-volt, 800 cps, 5% supply to the DVM by setting the Primary Signal Selector to 201.

15. Monitor the DVM to determine and record the 28-volt supply voltage.

16. Connect the 28-volt, 800 cps, 5% supply to the PAVM by setting the Primary Signal Selector to 201.

17. Monitor the PAVM to determine and record the 28-volt, 5% supply phase angle.

18. Connect the 6-volt, 400 cps, optics power supply to the DVM by setting the Primary Signal Selector to 250.

19. Adjust PANEL BRIGHTNESS control on G & N Indicator Control Panel to maximum.

20. Monitor the DVM to determine and record the 6-volt power supply voltage.

21. Connect the 6-volt, 400 cps, optics power supply to the Counter by setting the COUNTER INPUT 'D' SIGNAL switch on the Primary Signal Selector panel to 7. Assure that the D SIGNAL indicator is lighted.

22. Set the SAMPLE TIME (N_1) controls on the Counter to 400. Monitor the Counter to determine and record the period of the 6-volt supply.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

JDC
NO. 10702
REV. A
INITIAL TDRR 19950

JOB POWER CHECK

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE ______
NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2	Encoder excitation	volts, ac	2,375		2,625		
B.6	25.6 KC supply period	counts	99900		100100		
B.8	28V 1% supply	volts, ac	27.72		28.28		
B.11	28V 1% supply phase angle	deg	▨		▨	▨	▨
B.13	28V 1% supply period	counts	99900		100100		
B.15	28V 5% supply	volts, ac	26.6		29.4		
B.17	28V 5% supply phase shift w.r.t. 28V 1% supply	deg	value re-corded in step B.11 -95°		value re-corded in step B.11 -85°		

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 2

JDC
NO. 10702
REV. A

JOB POWER CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.20	6V supply	volts, ac	4.7		5.6		
B.22	6V supply period	counts	90909		111111		

DATE ______

Released with ATP 1009502

JDC 10702 REV. ____ PAGE 1 OF 2

JOB POWER CHECK

INITIAL TDRR 19950 D.S. PGS 2

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION Check power requirements of the optical subsystem.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES ATP 1009502 Para. 3-3.1, JDC's 18000, 18020, 18035, 18036, and 18040.

IMPORTANT JDC 10738 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the following pushbuttons on the Test Control panel are lighted:

   OIA ON/ISS POWER DISABLED

   OPTICS POWER ON

   BLOCK I SERIES 100.

   NOTE: Assure that the Counter, DVM, and PAVM have been energized at least 15 minutes immediately prior to use in this test.

2. Connect the 28-volt dc power to DVM by setting the Primary Signal Selector to 200.
3. Use the AGE VOLTAGE ADJUST control on the Test Selector Panel to adjust the voltage to 25.0 (-0, +0.25) volts.
4. Assure that the TIMING INHIBIT switch on the Apollo Computer Simulator is set to NORMAL.

B. PROCEDURE

1. Connect the optics encoder excitation to the DVM by setting the Primary Signal Selector to 102.
2. Monitor the DVM to determine and record the optics encoder excitation.
3. Connect the 25.6 KC supply to the Counter by setting the COUNTER INPUT 'D' SIGNAL switch on the Primary Signal Selector panel to 4. Assure that the D SIGNAL indicator is lighted.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB POWER CHECK | JDC 10702 REV PAGE 2 OF 2

SUBSYSTEM OPTICAL | ASSY

4. Set switches and controls on Counter to perform period function as follows:

   SAMPLE TIME (N_1) to 25600

   DISPLAY TIME (N_2) to 10^5

   DISPLAY RESET to ZERO

   CLOCK FREQUENCY DIVIDER to 1

   CLOCK SELECTOR to INT

   FUNCTION to RATIO OR PERIOD

   INPUT SELECTOR to C SENSE

   SENSE SELECTOR to FWD.

5. Adjust D Channel SLOPE, ATTEN, and TRIGGER switch and controls on Counter as required.
6. Monitor the Counter to determine and record the period of the 25.6 KC supply.
7. Connect the 28-volt, 800 cps, 1% supply to the DVM by setting the Primary Signal Selector to 101.
8. Monitor the DVM to determine and record the 28-volt supply voltage.
9. Connect the 28-volt, 800 cps, 1% supply to the PAVM by setting the Primary Signal Selector to 101.
10. Set the FREQUENCY switch on the PAVM to 800~ NO. 1.
11. Monitor the PAVM to determine and record the 28-volt supply phase angle.
12. Set the COUNTER INPUT 'D' SIGNAL switch on the Primary Signal Selector panel to 2.
13. Set the SAMPLE TIME (N_1) controls on the Counter to 800. Monitor the Counter to determine and record the period of the 28-volt, 800 cps, 1%, supply.
14. Connect the 28-volt, 800 cps, 5% supply to the DVM by setting the Primary Signal Selector to 201.
15. Monitor the DVM to determine and record the 28-volt supply voltage.
16. Connect the 28-volt, 800 cps, 5% supply to the PAVM by setting the Primary Signal Selector to 201.
17. Monitor the PAVM to determine and record the 28-volt, 5% supply phase angle.
18. Connect the 6-volt, 400 cps, optics power supply to the DVM by setting the Primary Signal Selector to 250.
19. Adjust PANEL BRIGHTNESS control on G & N Indicator Control Panel to maximum.
20. Monitor the DVM to determine and record the 6-volt power supply voltage.
21. Connect the 6-volt, 400 cps, optics power supply to the Counter by setting the COUNTER INPUT 'D' SIGNAL switch on the Primary Signal Selector panel to 7. Assure that the D SIGNAL indicator is lighted.
22. Set the SAMPLE TIME (N_1) controls on the Counter to 400. Monitor the Counter to determine and record the period of the 6-volt supply.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

NO. 10702 JDC
REV.
INITIAL TDRR 19950

JOB POWER CHECK

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE START ______ END ______ SITE / LOCATION

TIME START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2	Encoder excitation	volts, ac	2.375		2.625		
B.6	25.6 KC supply period	counts	99900		100100		
B.8	28V 1% supply	volts, ac	27.72		28.28		
B.11	28V 1% supply phase angle	deg	▨		▨	▨	▨
B.13	28V 1% supply period	counts	99900		100100		
B.15	28V 5% supply	volts, ac	26.6		29.4		
B.17	28V 5% supply phase shift w.r.t. 28V 1% supply	deg	value recorded in step B.11 -95°		value recorded in step B.11 -85°		

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 10702
REV.

JOB POWER CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.20	6V supply	volts, ac	4.7		5.6		
B.22	6V supply period	counts	90909		111111		

DATE ______

Released with ATP 1009502

JOB OPTICS-NAV. BASE ALIGNMENT CHECK | **JDC** 10703 **REV.** A **PAGE** 1 **OF** 4 | **INITIAL TDRR** 19950 **D.S. PGS** 2

SUBSYSTEM OPTICAL | **ASSY.**

DESCRIPTION Optical Unit Assembly to IMU mounting pads and pins alignment is checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-1-65	22219	1,3	-	WK	TM

REFERENCES ATP 1009502
Paragraph 3-3.9. JDC 10739
JDC 10185

IMPORTANT JDC 10185 shall have been performed.

INTERVAL

TOOLS AND MATERIAL Mercury pools (2)

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

    OIA ON
    OPTICS POWER ON
    BLOCK I SERIES 100.

3. Assure that the following pushbution and indicators on the Remote Optics Controller are lighted:

    ZERO OPTICS
    CONTROLLER DIRECT
    SCT DRIVE NORMAL
    SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

    TRACKER
    TRACKER POWER.

5. Set switches as follows:

    SHAFT SLEW CONTROL to OFF
    TRUNNION SLEW CONTROL to OFF
    SLAVE TELESCOPE to STAR LOS.

6. Install Portable Light Assembly to SXT eyepiece assembly and energize the Illuminator lamp.

7. Energize the AMA autocollimator reticle lamp.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ________

JOB OPTICS-NAV. BASE ALIGNMENT CHECK | **JDC** 10703 **REV** A **PAGE** 2 **OF** 4

SUBSYSTEM OPTICAL | **ASSY**

> NOTE: The Phase Angle Voltmeter (PAVM), Illuminator lamp, and Alignment Mirror Assembly (AMA) autocollimator reticle lamp shall have been energized for at least 15 minutes immediately prior to use. The mercury pools shall have been allowed to stabilize for at least 15 minutes before use.

8. Set the pellicle detent on the Alignment Mirror Assembly (AMA) to the 28.5° position.

9. Place a mercury pool on the Shaft Accuracy Tester directly under the SXT StLOS.

B. PROCEDURE

> NOTE: Adjust the Illuminator intensity as required for step B.1; the SXT LLOS may be covered to improve the StLOS image.

1. Adjust Rotary Table about the tilt and rotary axes until the SXT StLOS reticle pattern is aligned to the image reflected from the mercury pool.

2. Place the second mercury pool directly under the AMA autocollimator line-of-sight.

3. Record the Rotary Table rotary axis indication.

4. Record the Rotary Table tilt axis indication.

5. Monitor the SHAFT ANGLE CDU 16X resolver error output (in-phase rms voltage) on the PAVM by setting the Primary Signal Selector to 205. Record the PAVM indication.

6. Monitor the 2X TRUNNION CDU 16X resolver error output (in-phase rms voltage) on the PAVM by setting the Primary Signal Selector to 206. Record the PAVM indication.

7. Record the SHAFT ANGLE CDU indication.

8. Record the 2X TRUNNION CDU indication.

9. Position the AMA autocollimator to determine error about the Y_{nb} axis. (Light housing pointing South.)

10. Sight through the AMA autocollimator and adjust the micrometer drum so that the adjustable filar reticle line is centered on the return image of the fixed reticle.

11. Record the micrometer readout. Subtract the micrometer readout from the value recorded as ZR_y in JDC 10739 and record this difference, including sign, as ϵ_{STY} .

12. Position the AMA autocollimator to determine error about the X_{nb} axis. (Light housing pointing East.)

13. Sight through the AMA autocollimator and adjust the micrometer drum so that the adjustable filar reticle line is centered on the return image of the fixed reticle.

14. Record the micrometer readout. Subtract the micrometer readout from the value recorded as ZR_x in JDC 10739 and record this difference, including sign, as ϵ_{STX} .

DATE ________

JOB OPTICS-NAV. BASE ALIGNMENT CHECK | **JDC** 10703 **REV** A **PAGE** 3 **OF** 4

SUBSYSTEM OPTICAL | **ASSY**

15. Remove the mercury pools.

16. Press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the MANUAL indicator.

17. Using the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, drive 2X TRUNNION CDU indication to approximately 114.000 (57° LOS).

> NOTE: When positioning SAT Rotary Table, read the top dial and approach final setting through clockwise rotation of the drivewheel. Do not use the knurled knob.

18. Sight through the SXT eyepiece and adjust the SAT Rotary Table until the SXT reticle is superimposed on its image reflected from the SAT Rotary Table 57° mirror. If necessary, use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to adjust the SXT StLOS trunnion angle.

19. Assure that the SHAFT ANGLE CDU has not changed from the value recorded in step B.7. If it has, use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to reset the SHAFT ANGLE CDU to that value and repeat step B.18.

20. Record the SAT Rotary Table setting.

21. Record the 2X TRUNNION CDU indication.

22. Set the SAT Rotary Table to 180° 00' 00" (±1") from the setting recorded in step B.20.

23. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU indication in the positive direction to approximately 180.000.

24. Sight through the SXT eyepiece and use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to superimpose the SXT reticle R line on its image reflected from the SAT Rotary Table 57° mirror.

25. Record the SHAFT ANGLE CDU indication.

26. Set the SAT Rotary Table approximately to the setting recorded in step B.20.

27. Sight through the AMA autocollimator and adjust the micrometer drum until the adjustable filar reticle line is aligned to the projected SXT reticle R line. If necessary, use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to adjust the SXT StLOS trunnion angle to obtain the SXT reticle in the AMA autocollimator.

28. Record the micrometer readout. Subtract the micrometer readout from the value recorded as ZR_z in JDC 10739 and record this difference, including sign, as ϵ_{STZ}.

29. Remove the Alignment Mirror Assembly using the removal procedure defined in JDC 10185.

DATE ________

JOB OPTICS-NAV. BASE ALIGNMENT CHECK | **JDC** 10703 **REV** A **PAGE** 4 **OF** 4

SUBSYSTEM OPTICAL | **ASSY**

30. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

> NOTE: Symbols are defined as follows:
>
> ϵ_{STX} ; Angle from the Z_{nb} axis to the SXT StLOS about the X_{nb} axis when the Optical Subsystem is set to the ZERO OPTICS mode.
>
> ϵ_{STY} ; Angle from the Z_{nb} axis to the SXT StLOS about the Y_{nb} axis when the Optical Subsystem is set to the ZERO OPTICS mode.
>
> ϵ_{STZ} ; One-half the angle from the X_{nb}, Z_{nb} plane to the SXT StLOS when the Optical Subsystem is set to the ZERO OPTICS mode, subsequently set to the MANUAL mode, and the SXT trunnion is set to the maximum useful angle of 57° LOS.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

JDC
NO. 10703
REV. A
INITIAL TDRR 19950

JOB OPTICS-NAV. BASE ALIGNMENT CHECK

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END SITE / LOCATION ______
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE ______
NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.3	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
B.4	Rotary Table tilt axis	deg min sec	▨	° ' "	▨	▨	▨
B.5	SHAFT ANGLE CDU 16X resolver error in-phase	mv	▨		4		
B.6	2X TRUNNION CDU 16X resolver error in-phase	mv	▨		4		
B.7	SHAFT ANGLE CDU	deg	▨		▨	▨	▨
B.8	2X TRUNNION CDU	deg	▨		▨	▨	▨

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 2

JDC
NO. 10703
REV. A

JOB OPTICS-NAV. BASE ALIGNMENT CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.11	ZR_Y (JDC 10739)	min sec	▨	' "	▨	▨	▨
	AMA autocollimator micrometer readout	min sec	▨	(-) ' "	▨	▨	▨
	ϵ_{STY}	arc sec	-27	( ) "	+27		
B.14	ZR_X (JDC 10739)	min sec	▨	' "	▨	▨	▨
	AMA autocollimator micrometer readout	min sec	▨	(-) ' "	▨	▨	▨
	ϵ_{STX}	arc sec	-36	( ) "	+36		
B.20	SAT rotary table setting	deg min sec	▨	° ' "	▨	▨	▨
B.21	2X TRUNNION CDU	deg	▨		▨	▨	▨
B.25	SHAFT ANGLE CDU	deg	▨		▨	▨	▨
B.28	ZR_Z (JDC 10739)	min sec	▨	' "	▨	▨	▨
	AMA autocollimator micrometer readout	min sec	▨	(-) ' "	▨	▨	▨
	ϵ_{STZ}	arc sec	-20.0	( ) "	+20.0		

DATE ______

Released with ATP 1009502

JOB OPTICS-NAV. BASE ALIGNMENT CHECK

JDC 10703 **REV.** B **PAGE** 1 **OF** 4

INITIAL TDRR 19950 **D.S. PGS** 2

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION Optical Unit Assembly to IMU mounting pads and pins alignment is checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-1-65	22219	1,3	-	WK	TM
B	4-27-67	33678	1	-	EA	-

REFERENCES ATP 1009502
Paragraph 3-3.9. JDC 10739
JDC 10185

IMPORTANT JDC 10185 shall have been performed.

INTERVAL

TOOLS AND MATERIAL Mercury pools (2)

WARNING

Mercury is a toxic metal. When using equipment containing mercury avoid spilling mercury and contaminating equipment, clothing and body. After use of such equipment visually inspect area and equipment to verify the absence of mercury. Mercury vapor is toxic. Do not leave mercury in open container. Keep in tightly closed container when not in use.

CAUTION: Avoid spilling mercury from open mercury pool and contaminating equipment. Liquid or vaporous mercury can cause severe corrosion and/or cracking of unprotected aluminum surfaces and other non-ferrous metals. If mercury contamination of equipment exists, report to AC Electronics site manager and site quality control representative.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE ____________

JOB OPTICS-NAV. BASE ALIGNMENT CHECK | **JDC** 10703 **REV** B **PAGE** 2 **OF** 4

SUBSYSTEM OPTICAL | **ASSY**

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.
2. Assure that the following pushbuttons on the Test Control panel are lighted:
   - OIA ON
   - OPTICS POWER ON
   - BLOCK I SERIES 100.
3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:
   - ZERO OPTICS
   - CONTROLLER DIRECT
   - SCT DRIVE NORMAL
   - SXT DRIVE NORMAL.
4. Assure that the following pushbuttons are not lighted:
   - TRACKER
   - TRACKER POWER.
5. Set switches as follows:
   - SHAFT SLEW CONTROL to OFF
   - TRUNNION SLEW CONTROL to OFF
   - SLAVE TELESCOPE to STAR LOS.
6. Install Portable Light Assembly to SXT eyepiece assembly and energize the Illuminator lamp.
7. Energize the AMA autocollimator reticle lamp.

   NOTE: The Phase Angle Voltmeter (PAVM), Illuminator lamp, and Alignment Mirror Assembly (AMA) autocollimator reticle lamp shall have been energized for at least 15 minutes immediately prior to use. The mercury pools shall have been allowed to stabilize for at least 15 minutes before use.
8. Set the pellicle detent on the Alignment Mirror Assembly (AMA) to the 28.5° position.
9. Place a mercury pool on the Shaft Accuracy Tester directly under the SXT StLOS.

B. PROCEDURE

   NOTE: Adjust the Illuminator intensity as required for step B.1; the SXT LLOS may be covered to improve the StLOS image.
1. Adjust Rotary Table about the tilt and rotary axes until the SXT StLOS reticle pattern is aligned to the image reflected from the mercury pool.
2. Place the second mercury pool directly under the AMA autocollimator line-of-sight.
3. Record the Rotary Table rotary axis indication.

DATE ____________

JOB OPTICS-NAV. BASE ALIGNMENT CHECK | **JDC** 10703 **REV** B **PAGE** 3 **OF** 4

SUBSYSTEM OPTICAL | **ASSY**

4. Record the Rotary Table tilt axis indication.
5. Monitor the SHAFT ANGLE CDU 16X resolver error output (in-phase rms voltage) on the PAVM by setting the Primary Signal Selector to 205. Record the PAVM indication.
6. Monitor the 2X TRUNNION CDU 16X resolver error output (in-phase rms voltage) on the PAVM by setting the Primary Signal Selector to 206. Record the PAVM indication.
7. Record the SHAFT ANGLE CDU indication.
8. Record the 2X TRUNNION CDU indication.
9. Position the AMA autocollimator to determine error about the Y_{nb} axis. (Light housing pointing South.)
10. Sight through the AMA autocollimator and adjust the micrometer drum so that the adjustable filar reticle line is centered on the return image of the fixed reticle.
11. Record the micrometer readout. Subtract the micrometer readout from the value recorded as ZR_y in JDC 10739 and record this difference, including sign, as ϵ_{sty} .
12. Position the AMA autocollimator to determine error about the X_{nb} axis. (Light housing pointing East.)
13. Sight through the AMA autocollimator and adjust the micrometer drum so that the adjustable filar reticle line is centered on the return image of the fixed reticle.
14. Record the micrometer readout. Subtract the micrometer readout from the value recorded as ZR_x in JDC 10739 and record this difference, including sign, as ϵ_{stx} .
15. Remove the mercury pools.
16. Press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the MANUAL indicator.
17. Using the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, drive 2X TRUNNION CDU indication to approximately 114.000 (57° LOS).

    NOTE: When positioning SAT Rotary Table, read the top dial and approach final setting through clockwise rotation of the drivewheel. Do not use the knurled knob.
18. Sight through the SXT eyepiece and adjust the SAT Rotary Table until the SXT reticle is superimposed on its image reflected from the SAT Rotary Table 57° mirror. If necessary, use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to adjust the SXT StLOS trunnion angle.
19. Assure that the SHAFT ANGLE CDU has not changed from the value recorded in step B.7. If it has, use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to reset the SHAFT ANGLE CDU to that value and repeat step B.18.
20. Record the SAT Rotary Table setting.
21. Record the 2X TRUNNION CDU indication.
22. Set the SAT Rotary Table to 180° 00' 00" (±1") from the setting recorded in step B.20.

DATE ____________

JOB OPTICS-NAV. BASE ALIGNMENT CHECK | **JDC** 10703 **REV** B **PAGE** 4 **OF** 4

SUBSYSTEM OPTICAL | **ASSY**

23. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU indication in the positive direction to approximately 180.000.
24. Sight through the SXT eyepiece and use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to super impose the SXT reticle R line on its image reflected from the SAT Rotary Table 57° mirror.
25. Record the SHAFT ANGLE CDU indication.
26. Set the SAT Rotary Table approximately to the setting recorded in step B.20.
27. Sight through the AMA autocollimator and adjust the micrometer drum until the adjustable filar reticle line is aligned to the projected SXT reticle R line. If necessary, use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to adjust the SXT StLOS trunnion angle to obtain the SXT reticle in the AMA autocollimator.
28. Record the micrometer readout. Subtract the micrometer readout from the value recorded as ZR_z in JDC 10739 and record this difference, including sign, as ϵ_{stz}.
29. Remove the Alignment Mirror Assembly using the removal procedure defined in JDC 10185.
30. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

    NOTE: Symbols are defined as follows:

    ϵ_{stx} ; Angle from the Z_{nb} axis to the SXT StLOS about the X_{nb} axis when the Optical Subsystem is set to the ZERO OPTICS mode.

    ϵ_{sty} ; Angle from the Z_{nb} axis to the SXT StLOS about the Y_{nb} axis when the Optical Subsystem is set to the ZERO OPTICS mode.

    ϵ_{stz} ; One-half the angle from the X_{nb}, Z_{nb} plane to the SXT StLOS when the Optical Subsystem is set to the ZERO OPTICS mode, subsequently set to the MANUAL mode, and the SXT trunnion is set to the maximum useful angle of 57° LOS.

DATE ____________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 2

JDC
NO. 10703
REV. B
INITIAL TDRR 9950

JOB OPTICS-NAV. BASE ALIGNMENT CHECK

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.3	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
B.4	Rotary Table tilt axis	deg min sec	▨	° ' "	▨	▨	▨
B.5	SHAFT ANGLE CDU 16X resolver error in-phase	mv	▨		4		
B.6	2X TRUNNION CDU 16X resolver error in-phase	mv	▨		4		
B.7	SHAFT ANGLE CDU	deg	▨		▨	▨	▨
B.8	2X TRUNNION CDU	deg	▨		▨	▨	▨

DATE ____

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 2

JDC
NO. 10703
REV. B

JOB OPTICS-NAV. BASE ALIGNMENT CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.11	ZR_Y (JDC 10739)	min sec	▨	' "	▨	▨	▨
	AMA autocollimator micrometer readout	min sec	▨	(-) ' "	▨	▨	▨
	ϵ_{STY}	arc sec	-27	( ) "	+27		
B.14	ZR_X (JDC 10739)	min sec	▨	' "	▨	▨	▨
	AMA autocollimator micrometer readout	min sec	▨	(-) ' "	▨	▨	▨
	ϵ_{STX}	arc sec	-36	( ) "	+36		
B.20	SAT rotary table setting	deg min sec	▨	° ' "	▨	▨	▨
B.21	2X TRUNNION CDU	deg	▨		▨	▨	▨
B.25	SHAFT ANGLE CDU	deg	▨		▨	▨	▨
B.28	ZR_Z (JDC 10739)	min sec	▨	' "	▨	▨	▨
	AMA autocollimator micrometer readout	min sec	▨	(-) ' "	▨	▨	▨
	ϵ_{STZ}	arc sec	-20.0	( ) "	+20.0		

DATE ____

Released with ATP 1009502

JOB OPTICS-NAV. BASE ALIGNMENT CHECK

JDC 10703 **REV.** ____ **PAGE** 1 **OF** 4

INITIAL TDRR 19950 **D.S. PGS** 2

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION Optical Unit Assembly to IMU mounting pads and pins alignment is checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES ATP 1009502 Paragraph 3-3.9. JDC 10739 JDC 10185

IMPORTANT JDC 10185 shall have been performed.

INTERVAL

TOOLS AND MATERIAL Mercury pools (2)

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

    OIA ON/ISS POWER DISABLED
    OPTICS POWER ON
    BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

    ZERO OPTICS
    CONTROLLER DIRECT
    SCT DRIVE NORMAL
    SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

    TRACKER
    TRACKER POWER.

5. Set switches as follows:

    SHAFT SLEW CONTROL to OFF
    TRUNNION SLEW CONTROL to OFF
    SLAVE TELESCOPE to STAR LOS.

6. Install Portable Light Assembly to SXT eyepiece assembly and energize the Illuminator lamp.

7. Energize the AMA autocollimator reticle lamp.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB OPTICS-NAV. BASE ALIGNMENT CHECK **JDC** 10703 **REV** **PAGE** 2 **OF** 4

SUBSYSTEM OPTICAL **ASSY**

NOTE: The Phase Angle Voltmeter (PAVM), Illuminator lamp, and Alignment Mirror Assembly (AMA) autocollimator reticle lamp shall have been energized for at least 15 minutes immediately prior to use. The mercury pools shall have been allowed to stabilize for at least 15 minutes before use.

8. Set the pellicle detent on the Alignment Mirror Assembly (AMA) to the 28.5° position.

9. Place a mercury pool on the Shaft Accuracy Tester directly under the SXT StLOS.

B. PROCEDURE

NOTE: Adjust the Illuminator intensity as required for step B.1; the SXT LLOS may be covered to improve the StLOS image.

1. Adjust Rotary Table about the tilt and rotary axes until the SXT StLOS reticle pattern is aligned to the image reflected from the mercury pool.

2. Place the second mercury pool directly under the AMA autocollimator line-of-sight.

3. Record the Rotary Table rotary axis indication.

4. Record the Rotary Table tilt axis indication.

5. Monitor the SHAFT ANGLE CDU 16X resolver error output (in-phase rms voltage) on the PAVM by setting the Primary Signal Selector to 205. Record the PAVM indication.

6. Monitor the 2X TRUNNION CDU 16X resolver error output (in-phase rms voltage) on the PAVM by setting the Primary Signal Selector to 206. Record the PAVM indication.

7. Record the SHAFT ANGLE CDU indication.

8. Record the 2X TRUNNION CDU indication.

9. Position the AMA autocollimator to determine error about the Y_{nb} axis. (Light housing pointing South.)

10. Sight through the AMA autocollimator and adjust the micrometer drum so that the adjustable filar reticle line is centered on the return image of the fixed reticle.

11. Record the micrometer readout. Subtract the micrometer readout from the value recorded as ZR_y in JDC 10739 and record this difference, including sign, as ϵ_{sty}.

12. Position the AMA autocollimator to determine error about the X_{nb} axis. (Light housing pointing East.)

13. Sight through the AMA autocollimator and adjust the micrometer drum so that the adjustable filar reticle line is centered on the return image of the fixed reticle.

14. Record the micrometer readout. Subtract the micrometer readout from the value recorded as ZR_x in JDC 10739 and record this difference, including sign, as ϵ_{stx}.

DATE ______

JOB OPTICS-NAV. BASE ALIGNMENT CHECK **JDC** 10703 **REV** **PAGE** 3 **OF** 4

SUBSYSTEM OPTICAL **ASSY**

15. Remove the mercury pools.

16. Press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the MANUAL indicator.

17. Using the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, drive 2X TRUNNION CDU indication to approximately 114.000 (57° LOS).

NOTE: When positioning SAT Rotary Table, read the side dial and approach final setting through clockwise rotation of the drivewheel. Do not use the knurled knob.

18. Sight through the SXT eyepiece and adjust the SAT Rotary Table until the SXT reticle is superimposed on its image reflected from the SAT Rotary Table 57° mirror. If necessary, use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to adjust the SXT StLOS trunnion angle.

19. Assure that the SHAFT ANGLE CDU has not changed from the value recorded in step B.7. If it has, use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to reset the SHAFT ANGLE CDU to that value and repeat step B.18.

20. Record the SAT Rotary Table setting.

21. Record the 2X TRUNNION CDU indication.

22. Set the SAT Rotary Table to 180° 00' 00" (±1") from the setting recorded in step B.20.

23. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU indication in the positive direction to approximately 180.000.

24. Sight through the SXT eyepiece and use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to superimpose the SXT reticle R line on its image reflected from the SAT Rotary Table 57° mirror.

25. Record the SHAFT ANGLE CDU indication.

26. Set the SAT Rotary Table approximately to the setting recorded in step B.20.

27. Sight through the AMA autocollimator and adjust the micrometer drum until the adjustable filar reticle line is aligned to the projected SXT reticle R line.

28. Record the micrometer readout. Subtract the micrometer readout from the value recorded as ZR_Z in JDC 10739 and record this difference, including sign, as ϵ_{STZ}.

29. Remove the Alignment Mirror Assembly using the removal procedure defined in JDC 10185.

DATE ______

JOB OPTICS-NAV. BASE ALIGNMENT CHECK **JDC** 10703 **REV** **PAGE** 4 **OF** 4

SUBSYSTEM OPTICAL **ASSY**

30. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

NOTE: Symbols are defined as follows:

ϵ_{STX} ; Angle from the Z_{nb} axis to the SXT StLOS about the X_{nb} axis when the Optical Subsystem is set to the ZERO OPTICS mode.

ϵ_{STY} ; Angle from the Z_{nb} axis to the SXT StLOS about the Y_{nb} axis when the Optical Subsystem is set to the ZERO OPTICS mode.

ϵ_{STZ} ; One-half the angle from the X_{nb}, Z_{nb} plane to the SXT StLOS when the Optical Subsystem is set to the ZERO OPTICS mode, subsequently set to the MANUAL mode, and the SXT trunnion is set to the maximum useful angle of 57° LOS.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 2

JDC
NO. 10703
REV. ____
INITIAL TDRF 19950

JOB OPTICS-NAV. BASE ALIGNMENT CHECK

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ ____ CAL DATE
NAME ____ SER. NO. ____ ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.3	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
B.4	Rotary Table tilt axis	deg min sec	▨	° ' "	▨	▨	▨
B.5	SHAFT ANGLE CDU 16X resolver error in-phase	mv	▨		4		
B.6	2X TRUNNION CDU 16X resolver error in-phase	mv	▨		4		
B.7	SHAFT ANGLE CDU	deg	▨		▨	▨	▨
B.8	2X TRUNNION CDU	deg	▨		▨	▨	▨

DATE ____

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 2

JDC
NO. 10703
REV. ____

JOB OPTICS-NAV. BASE ALIGNMENT CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ -	ACC
B.11	ZR_Y (JDC 10739)	min sec	▨	' "	▨	▨	▨
	AMA autocollimator micrometer readout	min sec	▨	(-) ' "	▨	▨	▨
	ϵ_{STY}	arc sec	-27	( ) "	+27		
B.14	ZR_X (JDC 10739)	min sec	▨	' "	▨	▨	▨
	AMA autocollimator micrometer readout	min sec	▨	(-) ' "	▨	▨	▨
	ϵ_{STX}	arc sec	-36	( ) "	+36		
B.20	SAT rotary table setting	deg min sec	▨	° ' "	▨	▨	▨
B.21	2X TRUNNION CDU	deg	▨		▨	▨	▨
B.25	SHAFT ANGLE CDU	deg	▨		▨	▨	▨
B.28	ZR_Z (JDC 10739)	min sec	▨	' "	▨	▨	▨
	AMA autocollimator micrometer readout	min sec	▨	(-) ' "	▨	▨	▨
	ϵ_{STZ}	arc sec	-20.0	( ) "	+20.0		

DATE ____

Released with ATP 1009502

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC 10704 **REV.** A **PAGE** 1 **OF** 5

INITIAL TDRR 19950 **D.S. PGS.** 19

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SXT shaft accuracy is checked by comparing SCT panel shaft angle counter, SHAFT ANGLE CDU readout and shaft encoder output with Shaft Accuracy Tester rotary table angles. Shaft limits are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-16-65	22521	1, 3, 4	All	MGM	TM

REFERENCES ATP 1009502, Paragraphs 3-3.4, 3-3.10, and JDC - 10734

IMPORTANT JDC 10733 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

   OIA ON
   OPTICS POWER ON
   BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

   ZERO OPTICS
   CONTROLLER DIRECT
   SCT DRIVE NORMAL
   SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

   TRACKER
   TRACKER POWER.

5. Set switches as follows:

   SHAFT SLEW CONTROL to OFF
   TRUNNION SLEW CONTROL to OFF
   SLAVE TELESCOPE to STAR LOS.

6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB SXT SHAFT ACCURACY AND LIMITS TEST **JDC** 10704 **REV** A **PAGE** 2 **OF** 5

SUBSYSTEM OPTICAL **ASSY**

7. Place mercury pool on the Shaft Accuracy Tester directly under the SXT StLOS.

   NOTE: Allow the mercury pool to stabilize for at least 15 minutes before use.

8. Install the Portable Light Assembly to SXT eyepiece assembly and energize the Illuminator lamp.

   NOTE: The Phase Angle Voltmeter (PAVM), Illuminator lamp, and Counter shall have been energized for at least 15 minutes immediately prior to use in this test.

9. Connect the SHAFT ANGLE CDU encoder output to the Counter by setting the COUNTER INPUT "A" OR "AB" switch on the Primary Signal Selector panel to 17.

10. Set selectors on Counter to perform forward-reverse counting function as follows:

    DISPLAY RESET to ZERO
    DISPLAY TIME (N_2) to 10^5
    CLOCK FREQUENCY DIVIDER to 1
    CLOCK SELECTOR to INT
    FUNCTION to COUNT
    INPUT SELECTOR to A-B
    SENSE SELECTOR to FWD.

11. Use SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on Remote Optics Controller to drive SHAFT ANGLE CDU while adjusting ATTEN, SLOPE, and TRIGGER switches and controls on channels A and B of the Counter.

12. Press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the ZERO OPTICS indicator.

13. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

    NOTE: Adjust the Illuminator intensity as required for step 14; the SXT LLOS may be covered to improve the StLOS image.

14. Adjust Rotary Table about the tilt and rotary axes until the SXT StLOS reticle pattern is aligned to the image reflected from the mercury pool.

15. Record the Rotary Table rotary axis indication.

16. Record the Rotary Table tilt axis indication.

17. Connect the SHAFT ANGLE CDU 16X resolver error output to the PAVM by setting the Primary Signal Selector to 205.

18. Set the FREQUENCY switch on the PAVM to 800~ NO. 1.

19. Remove mercury pool from Shaft Accuracy Tester.

DATE ______

JOB SXT SHAFT ACCURACY AND LIMITS TEST **JDC** 10704 **REV** A **PAGE** 3 **OF** 5

SUBSYSTEM OPTICAL **ASSY**

B. PROCEDURE

1. Press the RESET pushbutton on the Counter.

2. Using the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, drive the 2X TRUNNION CDU to approximately 114.000 (57° LOS).

   NOTE: When positioning SAT rotary table, read the top dial and approach final setting through clockwise rotation of the drive wheel. Do not use the knurled knob. The side reads 30 minutes higher than the top dial; if the side dial is used, subtract 30 minutes.

3. Sight through the SXT eyepiece and adjust the SAT rotary table until the SXT reticle is superimposed on its image reflected from the SAT rotary table 57° mirror. If necessary, use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN control to adjust the SXT St LOS trunnion angle.

4. Record the SAT rotary table setting as the Zero Reference Position (ZRP).

5. Add each of the following incremental angles to the ZRP established in step B.4. If the sum is greater than 360°, subtract 360°. Rotate the SAT rotary table to within ±1 arc second of each calculated angle. At each position complete the following steps:

   a. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, drive the SHAFT ANGLE CDU in the positive direction until the SXT St LOS is approximately positioned on the SAT rotary table 57° mirror. For the first (zero) increment, drive the SHAFT ANGLE CDU through at least 10 degrees before positioning the StLOS to the 57° mirror.

   b. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, position the SXT StLOS until the SXT reticle R line is superimposed on its image reflected from the SAT rotary table 57° mirror.

   c. Record the SHAFT ANGLE CDU, Counter, and SCT panel shaft angle counter indications.

   d. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of the SHAFT ANGLE CDU 16X resolver error signal.

SAT Rotary Table Increments

(1)	0°	00'	00"
(2)	+349°	00'	00"
(3)	+338°	00'	00"
(4)	+315°	00'	00"
(5)	+273°	00'	00"
(6)	+217°	00'	00"
(7)	+190°	00'	00"
(8)	+120°	00'	00"
(9)	+95°	00'	00"

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JOB SXT SHAFT ACCURACY AND LIMITS TEST **JDC** 10704 **REV** A **PAGE** 4 **OF** 5

SUBSYSTEM OPTICAL **ASSY**

6. Add each of the following incremental angles to the ZRP established in step B.4. If the sum is greater than 360°, subtract 360°. Rotate the SAT rotary table to within ±1 arc second of each calculated angle. At each position, complete the following steps:

   a. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, drive the SHAFT ANGLE CDU in the negative direction until the SXT StLOS is approximately positioned on the SAT rotary table 57° mirror.

   b. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, position the SXT StLOS until the SXT reticle R line is superimposed on its image reflected from the SAT rotary table 57° mirror.

   c. Record the SHAFT ANGLE CDU, Counter, and SCT panel shaft angle counter indications.

   d. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of the SHAFT ANGLE CDU 16X resolver error signal.

SAT Rotary Table Increments

(1)	0°	00'	00"
(2)	+11°	00'	00"
(3)	+22°	00'	00"
(4)	+45°	00'	00"
(5)	+92°	00'	00"
(6)	+148°	00'	00"
(7)	+175°	00'	00"
(8)	+240°	00'	00"
(9)	+265°	00'	00"

7. Set the SAT rotary table to within ±1 arc second of the ZRP established in step B.4.

8. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the positive direction until the SXT St LOS is approximately positioned on the SAT rotary table 57° mirror.

9. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, position the SXT St LOS until the SXT reticle R line is superimposed on its image reflected from the SAT rotary table 57° mirror.

10. Record the Counter indication.

11. Set the COARSE GAIN CONTROL switch to HI.

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JOB SXT SHAFT ACCURACY AND LIMITS TEST | JDC 10704 REV A PAGE 5 OF 5

SUBSYSTEM OPTICAL | ASSY

12. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the positive direction to approximately 250.000.
13. Set the COARSE GAIN CONTROL switch to LO.
14. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the positive direction until the indicator dials stop moving. Record SHAFT ANGLE CDU indication.
15. Press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the ZERO OPTICS indicator.
16. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.
17. Set the COARSE GAIN CONTROL switch to HI.
18. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the negative direction to approximately 100.000.
19. Set the COARSE GAIN CONTROL switch to LO.
20. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the negative direction until the indicator dials stop moving. Record SHAFT ANGLE CDU indication.
21. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

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APOLLO G&N
EQUIPMENT TEST
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INITIAL TDRR 19950

JOB SXT SHAFT ACCURACY AND LIMITS TEST

ASSEMBLY UNDER TEST

TITLE ________
SER. NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ CAL DATE
NAME ________ SER. NO. ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
A. 15	Rotary Table rotary axis	deg min sec	▨	° ′ ″	▨	▨	▨
A. 16	Rotary Table tilt axis	deg min sec	▨	° ′ ″	▨	▨	▨
B. 5(1)	SAT rotary table ZRP from step B. 4	deg min sec	▨	° ′ ″	▨	▨	▨
	SHAFT ANGLE CDU	deg	359.987		0.013		
	Encoder count	pulses	(-)2		(+)2		
	Shaft Angle Counter	deg	359.81		0.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 19

JDC
NO. 10704
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 5(2)	SAT rotary table ZRP from Step B. 4	deg min sec	▨	° ′ ″	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+349° 00′ 00″	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ′ ″	▨	▨	▨
	SHAFT ANGLE CDU	deg	10.987		11.013		
	Encoder count	pulses	999		1003		
	Shaft Angle Counter	deg	10.81		11.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G&N
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 5(3)	SAT rotary table ZRP from Step B. 4	deg min sec	▨	° ′ ″	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+338° 00′ 00″	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ′ ″	▨	▨	▨
	SHAFT ANGLE CDU	deg	21.987		22.013		
	Encoder count	pulses	2000		2004		
	Shaft Angle Counter	deg	21.81		22.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G & N
EQUIPMENT TEST
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(4)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+315° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	44.987		45.013		
	Encoder count	pulses	4094		4098		
	Shaft Angle Counter	deg	44.81		45.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ______

APOLLO G & N
EQUIPMENT TEST
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JDC
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REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(5)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+273° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	86.987		87.013		
	Encoder count	pulses	7917		7921		
	Shaft Angle Counter	deg	86.81		87.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ______

APOLLO G & N
EQUIPMENT TEST
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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(6)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+217° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	142.987		143.013		
	Encoder count	pulses	13014		13018		
	Shaft Angle Counter	deg	142.81		143.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ______

APOLLO G & N
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JDC
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REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(7)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+190° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	169.987		170.013		
	Encoder count	pulses	15471		15475		
	Shaft Angle Counter	deg	169.81		170.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ______

APOLLO G&N
EQUIPMENT TEST
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JDC
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REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(8)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+120° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	239.987		240.013		
	Encoder Count	pulses	21843		21847		
	Shaft Angle Counter	deg	239.81		240.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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APOLLO G&N
EQUIPMENT TEST
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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(9)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+25° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	264.987		265.013		
	Encoder Count	pulses	24119		24123		
	Shaft Angle Counter	deg	264.81		265.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ______

APOLLO G&N
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JDC
NO. 10704
REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(1)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	359.987		0.013		
	Encoder count	pulses	(-) 2		(+) 2		
	Shaft Angle Counter	deg	359.81		0.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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APOLLO G&N
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JDC
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REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(2)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+11° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	348.987		349.013		
	Encoder count	pulses	999		1003		
	Shaft Angle Counter	deg	348.81		349.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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EQUIPMENT TEST
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JDC
NO. 10704
REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(3)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+22° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	337.987		338.013		
	Encoder count	pulses	2000		2004		
	Shaft Angle Counter	deg	337.81		338.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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EQUIPMENT TEST
DATA SHEET 13 **OF** 19

JDC
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REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(4)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+45° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	314.987		315.013		
	Encoder count	pulses	4094		4098		
	Shaft Angle Counter	deg	314.81		315.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 14 **OF** 19

JDC
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REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(5)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+92° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	267.987		268.013		
	Encoder count	pulses	8372		8376		
	Shaft Angle Counter	deg	267.81		268.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 15 **OF** 19

JDC
NO. 10704
REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(6)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+148° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	211.987		212.013		
	Encoder count	pulses	13469		13473		
	Shaft Angle Counter	deg	211.81		212.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 16 **OF** 19

JDC NO. 10704
REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(7)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+ 175° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	184.987		185.013		
	Encoder count	pulses	15927		15931		
	Shaft Angle Counter	deg	184.81		185.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

DATE ______

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JDC NO. 10704
REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(8)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+240° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	119.987		120.013		
	Encoder Count	pulses	21843		21847		
	Shaft Angle Counter	deg	119.81		120.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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JDC NO. 10704
REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(9)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+265° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	94.987		95.013		
	Encoder Count	pulses	24119		24123		
	Shaft Angle Counter	deg	94.81		95.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					
B.10	Encoder Count	pulses	pulses recorded in Step B.5(1) -1		pulses recorded in Step B.5(1) +1		

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JDC NO. 10704
REV. A

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.14	SHAFT ANGLE CDU	deg	270.000		280.000		
B.20	SHAFT ANGLE CDU	deg	80.000		90.000		

DATE ______

Released with ATP 1009502

JOB SXT SHAFT ACCURACY AND LIMITS TEST | JDC 10704 REV. B PAGE 1 OF 5 | INITIAL TDRR 19950 D.S. PGS 19

SUBSYSTEM OPTICAL | ASSY.

DESCRIPTION SXT shaft accuracy is checked by comparing SCT panel shaft angle counter, SHAFT ANGLE CDU readout and shaft encoder output with Shaft Accuracy Tester rotary table angles. Shaft limits are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA
A	9-16-65	22521	1, 3, 4	All	MGM	TM
B	11-24-65	24348	3	-	WK	-

REFERENCES ATP 1009502, Paragraphs 3-3.4, 3-3.10, and JDC - 10734

IMPORTANT JDC 10733 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

OIA ON
OPTICS POWER ON
BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

ZERO OPTICS
CONTROLLER DIRECT
SCT DRIVE NORMAL
SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

TRACKER
TRACKER POWER.

5. Set switches as follows:

SHAFT SLEW CONTROL to OFF
TRUNNION SLEW CONTROL to OFF
SLAVE TELESCOPE to STAR LOS.

6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

SUBSYSTEM OPTICAL | ASSY

7. Place mercury pool on the Shaft Accuracy Tester directly under the SXT StLOS.

NOTE: Allow the mercury pool to stabilize for at least 15 minutes before use.

8. Install the Portable Light Assembly to SXT eyepiece assembly and energize the Illuminator lamp.

NOTE: The Phase Angle Voltmeter (PAVM), Illuminator lamp, and Counter shall have been energized for at least 15 minutes immediately prior to use in this test.

9. Connect the SHAFT ANGLE CDU encoder output to the Counter by setting the COUNTER INPUT "A" OR "AB" switch on the Primary Signal Selector panel to 17.

10. Set selectors on Counter to perform forward-reverse counting function as follows:

DISPLAY RESET to ZERO
DISPLAY TIME (N_2) to 10^5
CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to COUNT
INPUT SELECTOR to A-B
SENSE SELECTOR to FWD.

11. Use SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on Remote Optics Controller to drive SHAFT ANGLE CDU while adjusting ATTEN, SLOPE, and TRIGGER switches and controls on channels A and B of the Counter.

12. Press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the ZERO OPTICS indicator.

13. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

NOTE: Adjust the Illuminator intensity as required for step 14; the SXT LLOS may be covered to improve the StLOS image.

14. Adjust Rotary Table about the tilt and rotary axes until the SXT StLOS reticle pattern is aligned to the image reflected from the mercury pool.

15. Record the Rotary Table rotary axis indication.

16. Record the Rotary Table tilt axis indication.

17. Connect the SHAFT ANGLE CDU 16X resolver error output to the PAVM by setting the Primary Signal Selector to 205.

18. Set the FREQUENCY switch on the PAVM to 800 ~ NO. 1.

19. Remove mercury pool from Shaft Accuracy Tester.

SUBSYSTEM OPTICAL | ASSY

B. PROCEDURE

1. Press the RESET pushbutton on the Counter.

2. Using the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, drive the 2X TRUNNION CDU to approximately 114.000 (57° LOS).

NOTE: When positioning SAT rotary table, read the top dial and approach final setting through clockwise rotation of the drive wheel. Do not use the knurled knob. The side dial reads 30 minutes higher than the top dial; if the side dial is used, subtract 30 minutes.

3. Sight through the SXT eyepiece and adjust the SAT rotary table until the SXT reticle is superimposed on its image reflected from the SAT rotary table 57° mirror. If necessary, use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN control to adjust the SXT St LOS trunnion angle.

4. Record the SAT rotary table setting as the Zero Reference Position (ZRP).

5. Add each of the following incremental angles to the ZRP established in step B.4. If the sum is greater than 360°, subtract 360°. Rotate the SAT rotary table to within ±1 arc second of each calculated angle. At each position complete the following steps:

a. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, drive the SHAFT ANGLE CDU in the positive direction until the SXT StLOS is approximately positioned on the SAT rotary table 57° mirror. For the first (zero) increment, drive the SHAFT ANGLE CDU through at least 10 degrees before positioning the StLOS to the 57° mirror.

b. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, position the SXT StLOS until the SXT reticle R line is superimposed on its image reflected from the SAT rotary table 57° mirror.

c. Record the SHAFT ANGLE CDU, Counter, and SCT panel shaft angle counter indications.

d. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of the SHAFT ANGLE CDU 16X resolver error signal.

	SAT Rotary Table Increments		
(1)	0°	00'	00"
(2)	+349°	00'	00"
(3)	+338°	00'	00"
(4)	+315°	00'	00"
(5)	+273°	00'	00"
(6)	+217°	00'	00"
(7)	+190°	00'	00"
(8)	+120°	00'	00"
(9)	+95°	00'	00"

SUBSYSTEM OPTICAL | ASSY

6. Add each of the following incremental angles to the ZRP established in step B.4. If the sum is greater than 360°, subtract 360°. Rotate the SAT rotary table to within ±1 arc second of each calculated angle. At each position, complete the following steps:

a. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, drive the SHAFT ANGLE CDU in the negative direction until the SXT StLOS is approximately positioned on the SAT rotary table 57° mirror.

b. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, position the SXT StLOS until the SXT reticle R line is superimposed on its image reflected from the SAT rotary table 57° mirror.

c. Record the SHAFT ANGLE CDU, Counter, and SCT panel shaft angle counter indications.

d. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of the SHAFT ANGLE CDU 16X resolver error signal.

	SAT Rotary Table Increments		
(1)	0°	00'	00"
(2)	+11°	00'	00"
(3)	+22°	00'	00"
(4)	+45°	00'	00"
(5)	+92°	00'	00"
(6)	+148°	00'	00"
(7)	+175°	00'	00"
(8)	+240°	00'	00"
(9)	+265°	00'	00"

7. Set the SAT rotary table to within ±1 arc second of the ZRP established in step B.4.

8. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the positive direction until the SXT St LOS is approximately positioned on the SAT rotary table 57° mirror.

9. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, position the SXT St LOS until the SXT reticle R line is superimposed on its image reflected from the SAT rotary table 57° mirror.

10. Record the Counter indication.

11. Set the COARSE GAIN CONTROL switch to HI.

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SUBSYSTEM OPTICAL | ASSY

12. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the positive direction to approximately 250.000.

13. Set the COARSE GAIN CONTROL switch to LO.

14. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the positive direction until the indicator dials stop moving. Record SHAFT ANGLE CDU indication.

15. Press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the ZERO OPTICS indicator.

16. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

17. Set the COARSE GAIN CONTROL switch to HI.

18. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the negative direction to approximately 100.000.

19. Set the COARSE GAIN CONTROL switch to LO.

20. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the negative direction until the indicator dials stop moving. Record SHAFT ANGLE CDU indication.

21. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

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EQUIPMENT TEST
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

ASSEMBLY UNDER TEST

TITLE ____

SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION

TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE

NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME / AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
A.15	Rotary Table rotary axis	deg min sec		° ' "			
A.16	Rotary Table tilt axis	deg min sec		° ' "			
B.5(1)	SAT rotary table ZRP from step B.4	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	359.987		0.013		
	Encoder count	pulses	(-)2		(+)2		
	Shaft Angle Counter	deg	359.81		0.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(2)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+349° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	10.987		11.013		
	Encoder count	pulses	999		1003		
	Shaft Angle Counter	deg	10.81		11.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(3)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+338° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	21.987		22.013		
	Encoder count	pulses	2000		2004		
	Shaft Angle Counter	deg	21.81		22.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(4)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+315° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	44.987		45.013		
	Encoder count	pulses	4094		4098		
	Shaft Angle Counter	deg	44.81		45.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JDC
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REV. B

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(5)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+273° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	86.987		87.013		
	Encoder count	pulses	7917		7921		
	Shaft Angle Counter	deg	86.81		87.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(6)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+217° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	142.987		143.013		
	Encoder count	pulses	13014		13018		
	Shaft Angle Counter	deg	142.81		143.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(7)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+190° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	169.987		170.013		
	Encoder count	pulses	15471		15475		
	Shaft Angle Counter	deg	169.81		170.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(8)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+120° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	239.987		240.013		
	Encoder Count	pulses	21843		21847		
	Shaft Angle Counter	deg	239.81		240.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(9)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+95° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	264.987		265.013		
	Encoder Count	pulses	24119		24123		
	Shaft Angle Counter	deg	264.81		265.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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JDC
NO. 10704
REV. B

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(1)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	359.987		0.013		
	Encoder count	pulses	(-) 2		(+) 2		
	Shaft Angle Counter	deg	359.81		0.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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JDC
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REV. B

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(2)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+ 11° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	348.987		349.013		
	Encoder count	pulses	999		1003		
	Shaft Angle Counter	deg	348.81		349.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(3)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+22° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	337.987		338.013		
	Encoder count	pulses	2000		2004		
	Shaft Angle Counter	deg	337.81		338.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(4)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+45° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	314.987		315.013		
	Encoder count	pulses	4094		4098		
	Shaft Angle Counter	deg	314.81		315.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(5)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+92° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	267.987		268.013		
	Encoder count	pulses	8372		8376		
	Shaft Angle Counter	deg	267.81		268.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JDC
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REV. B

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(6)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+148° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	211.987		212.013		
	Encoder count	pulses	13469		13473		
	Shaft Angle Counter	deg	211.81		212.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(7)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+175° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	184.987		185.013		
	Encoder count	pulses	15927		15931		
	Shaft Angle Counter	deg	184.81		185.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(8)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+240° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	119.987		120.013		
	Encoder Count	pulses	21843		21847		
	Shaft Angle Counter	deg	119.81		120.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(9)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+265° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	94.987		95.013		
	Encoder Count	pulses	24119		24123		
	Shaft Angle Counter	deg	94.81		95.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨
B.10	Encoder Count	pulses	pulses recorded in Step B.5(1) -1		pulses recorded in Step B.5(1) +1		

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DATA SHEET 19 **OF** 19

JDC
NO. 10704
REV. B

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.14	SHAFT ANGLE CDU	deg	270.000		280.000		
B.20	SHAFT ANGLE CDU	deg	80.000		90.000		

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Released with ATP 1009502

JOB SXT SHAFT ACCURACY AND LIMITS TEST

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INITIAL TDRR 19950 **D.S. PGS** 19

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SXT shaft accuracy is checked by comparing SCT panel shaft angle counter, SHAFT ANGLE CDU readout and shaft encoder output with Shaft Accuracy Tester rotary table angles. Shaft limits are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	1-16-65	22521	1,3,4	All	MGM	TM
B	11-24-65	24348	3	-	WK	-
C	5-3-67	33678	1	-	EA	-

(M

REFERENCES ATP 1009502, Paragraphs 3-3.4, 3-3.10, and JDC - 10734

IMPORTANT JDC 10733 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

WARNING

Mercury is a toxic metal. When using equipment containing mercury avoid spilling mercury and contaminating equipment, clothing and body. After use of such equipment visually inspect area and equipment to verify the absence of mercury. Mercury vapor is toxic. Do not leave mercury in open container. Keep in tightly closed container when not in use.

CAUTION: Avoid spilling mercury from open mercury pool and contaminating equipment. Liquid or vaporous mercury can cause severe corrosion and/or cracking of unprotected aluminum surfaces and other non-ferrous metals. If mercury contamination of equipment exists, report to AC Electronics site manager and site quality control representative.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE ______

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

OIA ON
OPTICS POWER ON
BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

ZERO OPTICS
CONTROLLER DIRECT
SCT DRIVE NORMAL
SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

TRACKER
TRACKER POWER.

5. Set switches as follows:

SHAFT SLEW CONTROL to OFF
TRUNNION SLEW CONTROL to OFF
SLAVE TELESCOPE to STAR LOS.

6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

7. Place mercury pool on the Shaft Accuracy Tester directly under the SXT StLOS.

NOTE: Allow the mercury pool to stabilize for at least 15 minutes before use.

8. Install the Portable Light Assembly to SXT eyepiece assembly and energize the Illuminator lamp.

NOTE: The Phase Angle Voltmeter (PAVM), Illuminator lamp, and Counter shall have been energized for at least 15 minutes immediately prior to use in this test.

9. Connect the SHAFT ANGLE CDU encoder output to the Counter by setting the COUNTER INPUT "A" OR "AB" switch on the Primary Signal Selector panel to 17.

10. Set selectors on Counter to perform forward-reverse counting function as follows:

DISPLAY RESET to ZERO
DISPLAY TIME (N_2) to 10^5
CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to COUNT
INPUT SELECTOR to A-B
SENSE SELECTOR to FWD.

11. Use SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on Remote Optics Controller to drive SHAFT ANGLE CDU while adjusting ATTEN, SLOPE, and TRIGGER switches and controls on channels A and B of the Counter.

12. Press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the ZERO OPTICS indicator.

13. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

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NOTE: Adjust the Illuminator intensity as required for step 14; the SXT LLOS may be covered to improve the StLOS image.

14. Adjust Rotary Table about the tilt and rotary axes until the SXT StLOS reticle pattern is aligned to the image reflected from the mercury pool.

15. Record the Rotary Table rotary axis indication.

16. Record the Rotary Table tilt axis indication.

17. Connect the SHAFT ANGLE CDU 16X resolver error output to the PAVM by setting the Primary Signal Selector to 205.

18. Set the FREQUENCY switch on the PAVM to 800~ NO. 1.

19. Remove mercury pool from Shaft Accuracy Tester.

B. PROCEDURE

1. Press the RESET pushbutton on the Counter.

2. Using the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, drive the 2X TRUNNION CDU to approximately 114.000 (57° LOS).

NOTE: When positioning SAT rotary table, read the top dial and approach final setting through clockwise rotation of the drive wheel. Do not use the knurled knob. The side dial reads 30 minutes higher than the top dial; if the side dial is used, subtract 30 minutes.

3. Sight through the SXT eyepiece and adjust the SAT rotary table until the SXT reticle is superimposed on its image reflected from the SAT rotary table 57° mirror. If necessary, use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN control to adjust the SXT St LOS trunnion angle.

4. Record the SAT rotary table setting as the Zero Reference Position (ZRP).

5. Add each of the following incremental angles to the ZRP established in step B.4. If the sum is greater than 360°, subtract 360°. Rotate the SAT rotary table to within ±1 arc second of each calculated angle. At each position complete the following steps:

a. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, drive the SHAFT ANGLE CDU in the positive direction until the SXT StLOS is approximately positioned on the SAT rotary table 57° mirror. For the first (zero) increment, drive the SHAFT ANGLE CDU through at least 10 degrees before positioning the StLOS to the 57° mirror.

b. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, position the SXT StLOS until the SXT reticle R line is superimposed on its image reflected from the SAT rotary table 57° mirror.

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c. Record the SHAFT ANGLE CDU, Counter, and SCT panel shaft angle counter indications.

d. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of the SHAFT ANGLE CDU 16X resolver error signal.

SAT Rotary Table Increments

(1)	0°	00'	00"
(2)	+349°	00'	00"
(3)	+338°	00'	00"
(4)	+315°	00'	00"
(5)	+273°	00'	00"
(6)	+217°	00'	00"
(7)	+190°	00'	00"
(8)	+120°	00'	00"
(9)	+95°	00'	00"

6. Add each of the following incremental angles to the ZRP established in step B.4. If the sum is greater than 360°, subtract 360°. Rotate the SAT rotary table to within ±1 arc second of each calculated angle. At each position, complete the following steps:

a. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, drive the SHAFT ANGLE CDU in the negative direction until the SXT StLOS is approximately positioned on the SAT rotary table 57° mirror.

b. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, position the SXT StLOS until the SXT reticle R line is superimposed on its image reflected from the SAT rotary table 57° mirror.

c. Record the SHAFT ANGLE CDU, Counter, and SCT panel shaft angle counter indications.

d. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of the SHAFT ANGLE CDU 16X resolver error signal.

SAT Rotary Table Increments

(1)	0°	00'	00"
(2)	+11°	00'	00"
(3)	+22°	00'	00"
(4)	+45°	00'	00"
(5)	+92°	00'	00"
(6)	+148°	00'	00"
(7)	+175°	00'	00"
(8)	+240°	00'	00"
(9)	+265°	00'	00"

7. Set the SAT rotary table to within ±1 arc second of the ZRP established in step B.4.

8. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the positive direction until the SXT St LOS is approximately positioned on the SAT rotary table 57° mirror.

9. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, position the SXT St LOS until the SXT reticle R line is superimposed on its image reflected from the SAT rotary table 57° mirror.

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JOB SXT SHAFT ACCURACY AND LIMITS TEST | JDC 10704 REV C PAGE 5 OF 5

SUBSYSTEM OPTICAL | ASSY

10. Record the Counter indication.
11. Set the COARSE GAIN CONTROL switch to HI.
12. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the positive direction to approximately 250.000.
13. Set the COARSE GAIN CONTROL switch to LO.
14. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the positive direction until the indicator dials stop moving. Record SHAFT ANGLE CDU indication.
15. Press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the ZERO OPTICS indicator.
16. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.
17. Set the COARSE GAIN CONTROL switch to HI.
18. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the negative direction to approximately 100.000.
19. Set the COARSE GAIN CONTROL switch to LO.
20. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the negative direction until the indicator dials stop moving. Record SHAFT ANGLE CDU indication.
21. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

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EQUIPMENT TEST
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

ASSEMBLY UNDER TEST

TITLE ____________
SER. NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________ SER. NO. ________ CAL DATE ________
NAME ____________ SER. NO. ________ CAL DATE ________

CONDUCTED BY ____________ NAME/AFFILIATION APPROVED BY ____________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
A.15	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
A.16	Rotary Table tilt axis	deg min sec	▨	° ' "	▨	▨	▨
B.5(1)	SAT rotary table ZRP from step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	359.987		0.013		
	Encoder count	pulses	(-)2		(+)2		
	Shaft Angle Counter	deg	359.81		0.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE 11 JUN 65

APOLLO G&N
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(2)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+349° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	10.987		11.013		
	Encoder count	pulses	999		1003		
	Shaft Angle Counter	deg	10.81		11.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(3)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+338° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	21.987		22.013		
	Encoder count	pulses	2000		2004		
	Shaft Angle Counter	deg	21.81		22.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(4)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+315° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	44.987		45.013		
	Encoder count	pulses	4094		4098		
	Shaft Angle Counter	deg	44.81		45.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(5)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+273° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	86.987		87.013		
	Encoder count	pulses	7917		7921		
	Shaft Angle Counter	deg	86.81		87.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(6)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+217° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	142.987		143.013		
	Encoder count	pulses	13014		13018		
	Shaft Angle Counter	deg	142.81		143.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(7)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+190° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	169.987		170.013		
	Encoder count	pulses	15471		15475		
	Shaft Angle Counter	deg	169.81		170.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(8)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+120° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	239.987		240.013		
	Encoder Count	pulses	21843		21847		
	Shaft Angle Counter	deg	239.81		240.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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FORM 00147
Chg. 7-23-65

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(9)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+95° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	264.987		265.013		
	Encoder Count	pulses	24119		24123		
	Shaft Angle Counter	deg	264.81		265.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(1)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	359.987		0.013		
	Encoder count	pulses	(-) 2		(+) 2		
	Shaft Angle Counter	deg	359.81		0.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(2)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+11° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	348.987		349.013		
	Encoder count	pulses	999		1003		
	Shaft Angle Counter	deg	348.81		349.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(3)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+22° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	337.987		338.013		
	Encoder count	pulses	2000		2004		
	Shaft Angle Counter	deg	337.81		338.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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JDC
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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(4)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+45° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	314.987		315.013		
	Encoder count	pulses	4094		4098		
	Shaft Angle Counter	deg	314.81		315.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(5)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+92° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	267.987		268.013		
	Encoder count	pulses	8372		8376		
	Shaft Angle Counter	deg	267.81		268.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(6)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+148° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	211.987		212.013		
	Encoder count	pulses	13469		13473		
	Shaft Angle Counter	deg	211.81		212.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

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JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(7)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+175° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	184.987		185.013		
	Encoder count	pulses	15927		15931		
	Shaft Angle Counter	deg	184.81		185.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE 11 JUN 65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 17 OF 19

JDC
NO. 10704
REV. C

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(8)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+240° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	119.987		120.013		
	Encoder Count	pulses	21843		21847		
	Shaft Angle Counter	deg	119.81		120.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE 11 JUN 65

FORM 00147
Chg. 7-23-65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 18 OF 19

JDC
NO. 10704
REV. C

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(9)	SAT rotary table ZRPfrom Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+265° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	94.987		95.013		
	Encoder Count	pulses	24119		24123		
	Shaft Angle Counter	deg	94.81		95.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨
B.10	Encoder Count	pulses	pulses recorded in Step B.5(1) -1		pulses recorded in Step B.5(1) +1		

DATE 11 JUN 65

FORM 00147
Chg. 7-23-65

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 19 OF 19

JDC
NO. 10704
REV. C

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.14	SHAFT ANGLE CDU	deg	270.000		280.000		
B.20	SHAFT ANGLE CDU	deg	80.000		90.000		

DATE 11 JUN 65

Released with ATP 1009502

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC 10704 **REV.** ____ **PAGE** 1 **OF** 5

INITIAL TDRR 19950 **D.S. PGS** 15

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SXT shaft accuracy is checked by comparing SCT panel shaft angle counter, SHAFT ANGLE CDU readout and shaft encoder output with Shaft Accuracy Tester rotary table angles. Shaft limits are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES ATP 1009502, Paragraphs 3-3.5, 3-3.11, and 3-3.14.2

IMPORTANT JDC 10733 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

OIA ON/ISS POWER DISABLED
OPTICS POWER ON
BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

ZERO OPTICS
CONTROLLER DIRECT
SCT DRIVE NORMAL
SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

TRACKER
TRACKER POWER.

5. Set switches as follows:

SHAFT SLEW CONTROL to OFF
TRUNNION SLEW CONTROL to OFF
SLAVE TELESCOPE to STAR LOS.

6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ________

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7. Place mercury pool on the Shaft Accuracy Tester directly under the SXT StLOS.

NOTE: Allow the mercury pool to stabilize for at least 15 minutes before use.

8. Install the Portable Light Assembly to SXT eyepiece assembly and energize the Illuminator lamp.

NOTE: The Phase Angle Voltmeter (PAVM), Illuminator lamp, and Counter shall have been energized for at least 15 minutes immediately prior to use in this test.

9. Connect the SHAFT ANGLE CDU encoder output to the Counter by setting the COUNTER INPUT "A" OR "AB" switch on the Primary Signal Selector panel to 17.

10. Set selectors on Counter to perform forward-reverse counting function as follows:

DISPLAY RESET to ZERO
DISPLAY TIME (N_2) to 10^5
CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to COUNT
INPUT SELECTOR to A-B
SENSE SELECTOR to FWD.

11. Use SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on Remote Optics Controller to drive SHAFT ANGLE CDU while adjusting ATTEN, SLOPE, and TRIGGER switches and controls on channels A and B of the Counter.

12. Press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the ZERO OPTICS indicator.

13. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

NOTE: Adjust the Illuminator intensity as required for step 14; the SXT LLOS may be covered to improve the StLOS image.

14. Adjust Rotary Table about the tilt and rotary axes until the SXT StLOS reticle pattern is aligned to the image reflected from the mercury pool.

15. Record the Rotary Table rotary axis indication.

16. Record the Rotary Table tilt axis indication.

17. Connect the SHAFT ANGLE CDU 16X resolver error output to the PAVM by setting the Primary Signal Selector to 205.

18. Set the FREQUENCY switch on the PAVM to 800 ~ NO. 1.

19. Remove mercury pool from Shaft Accuracy Tester.

DATE ________

B. PROCEDURE

1. Press the RESET pushbutton on the Counter.

2. Using the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, drive the 2X TRUNNION CDU to approximately 114.000 (57° LOS).

NOTE: When positioning SAT rotary table, read the side dial and approach final setting through clockwise rotation of the drive wheel. Do not use the knurled knob.

3. Sight through the SXT eyepiece and adjust the SAT rotary table until the SXT reticle is superimposed on its image reflected from the SAT rotary table 57° mirror. If necessary, use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN control to adjust the SXT StLOS trunnion angle.

4. Record the SAT rotary table setting as the Zero Reference Position (ZRP).

5. Add each of the following incremental angles to the ZRP established in step B.4. If the sum is greater than 360°, subtract 360°. Rotate the SAT rotary table to within ±1 arc second of each calculated angle. At each position complete the following steps:

a. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, drive the SHAFT ANGLE CDU in the positive direction until the SXT StLOS is approximately positioned on the SAT rotary table 57° mirror. For the first (zero) increment, drive the SHAFT ANGLE CDU through at least 10 degrees before positioning the StLOS to the 57° mirror.

b. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, position the SXT StLOS until the SXT reticle R line is superimposed on its image reflected from the SAT rotary table 57° mirror.

c. Record the SHAFT ANGLE CDU, Counter, and SCT panel shaft angle counter indications.

d. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of the SHAFT ANGLE CDU 16X resolver error signal.

SAT Rotary Table Increments

(1)	0°	00'	00"
(2)	+312°	00'	00"
(3)	+264°	00'	00"
(4)	+216°	00'	00"
(5)	+168°	00'	00"
(6)	+120°	00'	00"
(7)	+ 95°	00'	00"

DATE ________

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6. Add each of the following incremental angles to the ZRP established in step B.4. If the sum is greater than 360°, subtract 360°. Rotate the SAT rotary table to within ±1 arc second of each calculated angle. At each position, complete the following steps:

a. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, drive the SHAFT ANGLE CDU in the negative direction until the SXT StLOS is approximately positioned on the SAT rotary table 57° mirror.

b. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller, position the SXT StLOS until the SXT reticle R line is superimposed on its image reflected from the SAT rotary table 57° mirror.

c. Record the SHAFT ANGLE CDU, Counter, and SCT panel shaft angle counter indications.

d. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of the SHAFT ANGLE CDU 16X resolver error signal.

SAT Rotary Table Increments

(1)	0°	00'	00"
(2)	+ 48°	00'	00"
(3)	+ 96°	00'	00"
(4)	+144°	00'	00"
(5)	+192°	00'	00"
(6)	+240°	00'	00"
(7)	+265°	00'	00"

7. Set the SAT rotary table to within ±1 arc second of the ZRP established in step B.4.

8. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the positive direction until the SXT StLOS is approximately positioned on the SAT rotary table 57° mirror.

9. Using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL, position the SXT StLOS until the SXT reticle R line is superimposed on its image reflected from the SAT rotary table 57° mirror.

10. Record the Counter indication.

11. Set the COARSE GAIN CONTROL switch to HI.

12. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the positive direction to approximately 350.000.

13. Set the COARSE GAIN CONTROL switch to LO.

DATE ________

JOB SXT SHAFT ACCURACY AND LIMITS TEST | **JDC** 10704 **REV** | **PAGE** 5 **OF** 5

SUBSYSTEM OPTICAL | **ASSY**

14. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the positive direction until the indicator dials stop moving. Record SHAFT ANGLE CDU indication.
15. Press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the ZERO OPTICS indicator.
16. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.
17. Set the COARSE GAIN CONTROL switch to HI.
18. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the negative direction to approximately 100.000.
19. Set the COARSE GAIN CONTROL switch to LO.
20. Using the SHAFT SLEW CONTROL switch and FINE GAIN CONTROL, drive the SHAFT ANGLE CDU in the negative direction until the indicator dials stop moving. Record SHAFT ANGLE CDU indication.
21. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 15

JDC
NO. 10704
REV. -
INITIAL TDRR 19950

JOB SXT SHAFT ACCURACY AND LIMITS TEST

ASSEMBLY UNDER TEST

TITLE ________
SER. NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION
TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ CAL DATE ________
NAME ________ SER. NO. ________ CAL DATE ________

CONDUCTED BY ________ NAME/AFFILIATION   APPROVED BY ________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
A.15	Rotary Table rotary axis	deg min sec		° ' "			
A.16	Rotary Table tilt axis	deg min sec		° ' "			
B.5(1)	SAT rotary table ZRP from step B.4	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	359.987		0.013		
	Encoder count	pulses	(-)2		(+)2		
	Shaft Angle Counter	deg	359.81		0.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 **OF** 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(2)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		312° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	47.987		48.013		
	Encoder count	pulses	4367		4371		
	Shaft Angle Counter	deg	47.81		48.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 **OF** 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(3)	SAT rotary table ZRP from Step B.4	deg min sec		° ' "			
	SAT rotary table increment	deg min sec		+264° 00' 00"			
	SAT rotary table position	deg min sec		° ' "			
	SHAFT ANGLE CDU	deg	95.987		96.013		
	Encoder count	pulses	8736		8740		
	Shaft Angle Counter	deg	95.81		96.19		
	16X resolver error in-phase	mv					
	16X resolver error quadrature	mv					

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 4 **OF** 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(4)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+216° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	143.987		144.01		
	Encoder count	pulses	13105		13109		
	Shaft Angle Counter	deg	143.81		144.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(5)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+168° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	191.987		192.013		
	Encoder count	pulses	17474		17478		
	Shaft Angle Counter	deg	191.81		192.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 **OF** 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(6)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+120° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	239.987		240.013		
	Encoder count	pulses	21843		21847		
	Shaft Angle Counter	deg	239.81		240.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 **OF** 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.5(7)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+95° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	264.987		265.013		
	Encoder count	pulses	24119		24123		
	Shaft Angle Counter	deg	264.81		265.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 8 OF 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(1)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	359.987		0.013		
	Encoder count	pulses	(-) 2		(+) 2		
	Shaft Angle Counter	deg	359.81		0.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 9 OF 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(2)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+48° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	311.987		312.013		
	Encoder count	pulses	4367		4371		
	Shaft Angle Counter	deg	311.81		312.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 10 OF 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(3)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+96° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	263.987		264.013		
	Encoder count	pulses	8736		8740		
	Shaft Angle Counter	deg	263.81		264.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 11 OF 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(4)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+144° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	215.987		216.013		
	Encoder count	pulses	13105		13109		
	Shaft Angle Counter	deg	215.81		216.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(5)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+192° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	167.987		168.013		
	Encoder count	pulses	17474		17478		
	Shaft Angle Counter	deg	167.81		168.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 **OF** 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(6)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+240° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	119.987		120.013		
	Encoder count	pulses	21843		21847		
	Shaft Angle Counter	deg	119.81		120.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 14 **OF** 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6(7)	SAT rotary table ZRP from Step B.4	deg min sec	▨	° ' "	▨	▨	▨
	SAT rotary table increment	deg min sec	▨	+265° 00' 00"	▨	▨	▨
	SAT rotary table position	deg min sec	▨	° ' "	▨	▨	▨
	SHAFT ANGLE CDU	deg	94.987		95.013		
	Encoder count	pulses	24119		24123		
	Shaft Angle Counter	deg	94.81		95.19		
	16X resolver error in-phase	mv	▨		▨	▨	▨
	16X resolver error quadrature	mv	▨		▨	▨	▨
B.10	Encoder count	pulses	pulses recorded in step B.4 (1) - 1		pulses recorded in step B.4 (1) + 1		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 15 **OF** 15

JDC
NO. 10704
REV. -

JOB SXT SHAFT ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.14	SHAFT ANGLE CDU	deg	270.000		280.000		
B.20	SHAFT ANGLE CDU	deg	80.000		90.000		

DATE ________

Released with ATP 1009502

JOB SCT SHAFT ACCURACY TEST

JDC 10705 **REV.** A **PAGE** 1 **OF** 4

INITIAL TDRR 19950 **D.S. PGS** 18

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SCT shaft accuracy is checked by comparing the SCT panel shaft angle counter, SHAFT ANGLE CDU readout, and shaft encoder output with SXT shaft angles.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-16-65	22522	1,3,4	All	MGM	TM

REFERENCES ATP 1009502, Paragraph 3-3.10
JDC 10704

IMPORTANT JDC 10704 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

   OIA ON
   OPTICS POWER ON
   BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

   ZERO OPTICS
   CONTROLLER DIRECT
   SCT DRIVE NORMAL
   SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

   TRACKER
   TRACKER POWER.

5. Set switches as follows:

   SHAFT SLEW CONTROL to OFF
   TRUNNION SLEW CONTROL to OFF
   SLAVE TELESCOPE to STAR LOS.

6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

7. Set the tilt axis of the Rotary Table to approximately 0°.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

8. Install the Portable Light Assembly on the SXT eyepiece assembly and energize the Illuminator lamp. Set intensity switch for maximum intensity.

   NOTE: The Phase Angle Voltmeter (PAVM), Illuminator lamp, and Counter shall have been energized for at least 15 minutes immediately prior to use.

9. Connect the SHAFT ANGLE CDU encoder output to the Counter by setting the COUNTER INPUT "A" OR "AB" selector on Primary Signal Selector panel to 17.

10. Set selectors on Counter to perform forward-reverse counting function as follows:

    DISPLAY TIME (N_2) to 10^5
    DISPLAY RESET to ZERO
    CLOCK FREQUENCY DIVIDER to 1
    CLOCK SELECTOR to INT
    FUNCTION to COUNT
    INPUT SELECTOR to A-B
    SENSE SELECTOR to FWD.

11. Use SHAFT SLEW CONTROL switch and FINE GAIN CONTROL on Remote Optics Controller to drive SHAFT ANGLE CDU while adjusting ATTEN, SLOPE, and TRIGGER switches and controls on channels A and B of the Counter.

12. Press the MANUAL/ZERO OPTICS pushbutton to light the ZERO OPTICS indicator.

13. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

14. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller to drive the 2X TRUNNION CDU to 114.000 (±0.005)° (57° LOS).

15. Connect SCT Shaft 1X resolver error signal to PAVM by setting Primary Signal Selector to 210.

16. Set the FREQUENCY switch on the PAVM to 800~ No. 1.

17. Press the RESET pushbutton on the Counter.

18. Adjust BRIGHTNESS control (inside the side access panel of the Remote Optics Controller) until the SCT reticle illumination is at a comfortable level.

DATE ______

B. PROCEDURE

1. Perform the following steps for each of the SHAFT ANGLE CDU INDICATIONS listed in Table I:

   NOTE: In step B.1.a, drive the SHAFT ANGLE CDU in the negative direction to the first setting (095.000). Thereafter, drive in the positive direction to each of the indicated settings except the last (zero) setting.

   a. Drive the SHAFT ANGLE CDU to within ±0.003° of the indicated setting using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller.

   b. Record the Counter and SCT panel shaft angle counter indications.

   c. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of the SCT shaft 1X resolver error signal.

   d. Press the SCT DRIVE NORMAL/SCT DRIVE DISABLED pushbutton to light the SCT DRIVE DISABLED indicator.

   NOTE: Assure that the SCT shaft has not moved.

   e. While sighting through the SCT eyepiece, position the Retroreflecting Prism until the filaments in the Illuminator are visible.

   f. With the Retroreflecting Prism carefully held in the position set in step B.1.e, remove the Illuminator from the SXT eyepiece and place it in the SCT eyepiece. Sight through the SXT eyepiece and use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to align the SXT reticle "R" line to the projected image of the SCT reticle "R" line.

   g. Record the Counter and SHAFT ANGLE CDU indications.

   h. Remove the Retroreflecting Prism and replace the Illuminator in the SXT eyepiece assembly.

   i. Press the SCT DRIVE NORMAL/SCT DRIVE DISABLED pushbutton to light the SCT DRIVE NORMAL indicator.

   j. Record the corresponding SHAFT ANGLE CDU indication from JDC 10704 as indicated on the data sheet, and perform the indicated calculations.

DATE ______

Table I

SHAFT ANGLE CDU INDICATIONS

	ANGLE	SHAFT CDU INDICATION
(1)	-265°	095.000
(2)	-240°	120.000
(3)	-175°	185.000
(4)	-148°	212.000
(5)	-92°	268.000
(6)	-45°	315.000
(7)	-22°	338.000
(8)	-11°	349.000
(9)	0°	000.000
(10)	11°	011.000
(11)	22°	022.000
(12)	45°	045.000
(13)	87°	087.000
(14)	143°	143.000
(15)	170°	170.000
(16)	240°	240.000
(17)	265°	265.000
(18)	0°	000.000

2. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 18

JDC
NO. 10705
REV. A
INITIAL TDRR - 19950

JOB SCT SHAFT ACCURACY TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(1)	SHAFT ANGLE CDU from JDC 10704 step B. 6(9)	deg		______			
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ΔCDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ( ) (-) 095. 000			
	ΔTPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ΔENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(2)	SHAFT ANGLE CDU from JDC 10704 step B. 6(8)	deg		______			
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ΔCDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ( ) (-) 120. 000			
	ΔTPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ΔENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(3)	SHAFT ANGLE CDU from JDC 10704 step B. 6(7)	deg		______			
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ΔCDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ( ) (-) 185. 000			
	ΔTPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ΔENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(4)	SHAFT ANGLE CDU from JDC 10704 step B. 6(6)	deg		______			
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ΔCDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ( ) (-) 212. 000			
	ΔTPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ΔENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(5)	SHAFT ANGLE CDU from JDC 10704 step B. 6(5)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(–)			
	ε CDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ( ) (-) 268. 000			
	ε TPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(6)	SHAFT ANGLE CDU from JDC 10704 step B. 6(4)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ( ) (-) 315. 000			
	ε TPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(7)	SHAFT ANGLE CDU from JDC 10704 step B. 6(3)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ( ) (-) 338. 000			
	ε TPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(8)	SHAFT ANGLE CDU from JDC 10704 step B. 6(2)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ( ) (-) 349. 000			
	ε TPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 OF 18

JDC
NO. 10705
REV.

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	RE.	ACC
B. 1(9)	SHAFT ANGLE CDU from JDC 10704 step B. 6(1)	deg		______			
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-) ______			
	◂ CDU DIALS-SCT	deg	-0.171	( ) ______	+0.171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ______			
				( ) ______ (-) 000.000			
	◂ TPAC-SCT	deg	-0.06	( ) ______	+0.06		
(b)	Encoder count step B. 1b	pulses		( ) ______			
(g)	Encoder count step B. 1g	pulses		(-) ( ) ______			
	◂ ENC-SCT	pulses	-16	( ) ______	+16		
(c)	1X resolver error in-phase	mv		( ) ______			
(c)	1X resolver error quadrature	mv		( ) ______			

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(10)	SHAFT ANGLE CDU from JDC 10704 step B. 5(2)	deg		______			
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-) ______			
	◂ CDU DIALS-SCT	deg	-0.171	( ) ______	+0.171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ______			
				( ) ______ (-) 011.000			
	◂ TPAC-SCT	deg	-0.06	( ) ______	+0.06		
(b)	Encoder count step B. 1b	pulses		( ) ______			
(g)	Encoder count step B. 1g	pulses		(-) ( ) ______			
	◂ ENC-SCT	pulses	-16	( ) ______	+16		
(c)	1X resolver error in-phase	mv		( ) ______			
(c)	1X resolver error quadrature	mv		( ) ______			

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	R.J	ACC
B. 1(11)	SHAFT ANGLE CDU from JDC 10704 step B. 5(3)	deg		______			
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-) ______			
	◂ CDU DIALS-SCT	deg	-0.171	( ) ______	+0.171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ______			
				( ) ______ (-) 022.000			
	◂ TPAC-SCT	deg	-0.06	( ) ______	+0.06		
(b)	Encoder count step B. 1b	pulses		( ) ______			
(g)	Encoder count step B. 1g	pulses		(-) ( ) ______			
	◂ ENC-SCT	pulses	-16	( ) ______	+16		
(c)	1X resolver error in-phase	mv		( ) ______			
(c)	1X resolver error quadrature	mv		( ) ______			

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(12)	SHAFT ANGLE CDU from JDC 10704 step B. 5(4)	deg		______			
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-) ______			
	◂ CDU DIALS-SCT	deg	-0.171	( ) ______	+0.171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ______			
				( ) ______ (-) 045.000			
	◂ TPAC-SCT	deg	-0.06	( ) ______	+0.06		
(b)	Encoder count step B. 1b	pulses		( ) ______			
(g)	Encoder count step B. 1g	pulses		(-) ( ) ______			
	◂ ENC-SCT	pulses	-16	( ) ______	+16		
(c)	1X resolver error in-phase	mv		( ) ______			
(c)	1X resolver error quadrature	mv		( ) ______			

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(13)	SHAFT ANGLE CDU from JDC 10704 step B. 5(5)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 087. 000			
	ε TPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 14 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(14)	SHAFT ANGLE CDU from JDC 10704 step B. 5(6)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 143. 000			
	ε TPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 15 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(15)	SHAFT ANGLE CDU from JDC 10704 step B. 5(7)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 170. 000			
	ε TPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 16 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(16)	SHAFT ANGLE CDU from JDC 10704 step B. 5(8)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0. 171	( )	+ 0. 171		
(b)	Shaft Angle Counter Step B. 1b	deg		(+)			
				( ) (-) 240. 000			
	ε TPAC-SCT	deg	-0. 06	( )	+ 0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+ 16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 17 OF 18

JDC
NO. 10705
REV.

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(17)	SHAFT ANGLE CDU from JDC 10704 step B.5(9)	deg					
(g)	SHAFT ANGLE CDU step B.1g	deg		(-)			
	ϵ CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+)			
				( )			
				(-) 265.000			
	ϵ TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B.1b	pulses		( )			
(g)	Encoder count step B.1g	pulses		(-) ( )			
	ϵ ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 18 OF 18

JDC
NO. 10705
REV. A

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(18)	SHAFT ANGLE CDU from JDC 10704 step B.5(1)	deg					
(g)	SHAFT ANGLE CDU step B.1g	deg		(-)			
	ϵ CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+)			
				( )			
				(-) 000.000			
	ϵ TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B.1b	pulses		( )			
(g)	Encoder count step B.1g	pulses		(-) ( )			
	ϵ ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ______

Released with ATP 1009502

JOB SCT SHAFT ACCURACY TEST

JDC 10705 REV. B PAGE 1 OF 4

INITIAL TDRR 19950 D.S. PGS 18

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SCT shaft accuracy is checked by comparing the SCT panel shaft angle counter, SHAFT ANGLE CDU readout, and shaft encoder output with SXT shaft angles.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA
A	9-16-65	22522	1, 3, 4	All	MGM	TM
B	12-22-65	24847	3	-	W. K.	-

REFERENCES ATP 1009502, Paragraph 3-3.10
JDC 10704

IMPORTANT JDC 10704 shal have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:
   OIA ON
   OPTICS POWER ON
   BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:
   ZERO OPTICS
   CONTROLLER DIRECT
   SCT DRIVE NORMAL
   SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:
   TRACKER
   TRACKER POWER.

5. Set switches as follows:
   SHAFT SLEW CONTROL to OFF
   TRUNNION SLEW CONTROL to OFF
   SLAVE TELESCOPE to STAR LOS.

6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

7. Set the tilt axis of the Rotary Table to approximately 0°.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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8. Install the Portable Light Assembly on the SXT eyepiece assembly and energize the Illuminator lamp. Set intensity switch for maximum intensity.

   NOTE: The Phase Angle Voltmeter (PAVM), Illuminator lamp, and Counter shall have been energized for at least 15 minutes immediately prior to use.

9. Connect the SHAFT ANGLE CDU encoder output to the Counter by setting the COUNTER INPUT "A" OR "AB" selector on Primary Signal Selector panel to 17.

10. Set selectors on Counter to perform forward-reverse counting function as follows:
   DISPLAY TIME (N_2) to 10^5
   DISPLAY RESET to ZERO
   CLOCK FREQUENCY DIVIDER to 1
   CLOCK SELECTOR to INT
   FUNCTION to COUNT
   INPUT SELECTOR to A-B
   SENSE SELECTOR to FWD.

11. Use SHAFT SLEW CONTROL switch and FINE GAIN CONTROL on Remote Optics Controller to drive SHAFT ANGLE CDU while adjusting ATTEN, SLOPE, and TRIGGER switches and controls on channels A and B of the Counter.

12. Press the MANUAL/ZERO OPTICS pushbutton to light the ZERO OPTICS indicator.

13. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

14. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller to drive the 2X TRUNNION CDU to 114.000 (±0.005)° (57° LOS).

15. Connect SCT Shaft 1X resolver error signal to PAVM by setting Primary Signal Selector to 210.

16. Set the FREQUENCY switch on the PAVM to 800~ No. 1.

17. Press the RESET pushbutton on the Counter.

18. Adjust BRIGHTNESS control (inside the side access panel of the Remote Optics Controller) until the SCT reticle illumination is at a comfortable level.

B. PROCEDURE

1. Perform the following steps for each of the SHAFT ANGLE CDU INDICATIONS listed in Table I:

   NOTE: In step B.1.a, drive the SHAFT ANGLE CDU in the negative direction to the first setting (095.000). Thereafter, drive in the positive direction to each of the indicated settings except the last (zero) setting.

a. Drive the SHAFT ANGLE CDU to within ±0.003° of the indicated setting using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller.

b. Record the Counter and SCT panel shaft angle counter indications.

c. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of the SCT shaft 1X resolver error signal.

d. Press the SCT DRIVE NORMAL/SCT DRIVE DISABLED pushbutton to light the SCT DRIVE DISABLED indicator.

   NOTE: Assure that the SCT shaft has not moved.

e. While sighting through the SCT eyepiece, position the Retroreflecting Prism until the filaments in the Illuminator are visible.

   NOTE: If the SCT field of view is obstructed, adjust the trunnion angle with the TRUNNION SLEW CONTROL switch. Maintain a trunnion angle of greater than 50° LOS (100° on 2X TRUNNION CDU). One (1) adjustment of the trunnion angle should allow complete performance of this JDC. Record the 2X TRUNNION CDU indication of the trunnion angle used on the bottom of DATA SHEET 1.

f. With the Retroreflecting Prism carefully held in the position set in step B.1.e, remove the Illuminator from the SXT eyepiece and place it in the SCT eyepiece. Sight through the SXT eyepiece and use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to align the SXT reticle "R" line to the projected image of the SCT reticle "R" line.

g. Record the Counter and SHAFT ANGLE CDU indications.

h. Remove the Retroreflecting Prism and replace Illuminator in SXT eyepiece assembly.

i. Press the SCT DRIVE NORMAL/SCT DRIVE DISABLED pushbutton to light the SCT DRIVE NORMAL indicator.

j. Record the corresponding SHAFT ANGLE CDU indication from JDC 10704 as indicated on the data sheet, and perform the indicated calculations.

Table I

SHAFT ANGLE CDU INDICATIONS

	ANGLE	SHAFT CDU INDICATION
(1)	-265°	095.000
(2)	-240°	120.000
(3)	-175°	185.000
(4)	-148°	212.000
(5)	-92°	268.000
(6)	-45°	315.000
(7)	-22°	338.000
(8)	-11°	349.000
(9)	0°	000.000
(10)	11°	011.000
(11)	22°	022.000
(12)	45°	045.000
(13)	87°	087.000
(14)	143°	143.000
(15)	170°	170.000
(16)	240°	240.000
(17)	265°	265.000
(18)	0°	000.000

2. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

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EQUIPMENT TEST
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JDC
NO. 10705
REV. B
INITIAL TDRR 19950

JOB SCT SHAFT ACCURACY TEST

ASSEMBLY UNDER TEST	TEST HISTORY
TITLE ______	DATE ______ START ______ END ______ SITE / LOCATION
SER. NO. ______ DWG ______ REV. ______	TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL. DATE

NAME ______ SER. NO. ______ CAL. DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(1)	SHAFT ANGLE CDU from JDC 10704 step B.6(9)	deg		______			
(g)	SHAFT ANGLE CDU step B.1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+)			
				( ) (-) 095.000			
	ε TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B.1b	pulses		( )			
(g)	Encoder count step B.1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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EQUIPMENT TEST
DATA SHEET 2 **OF** 18

JDC
NO. 10705
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JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(2)	SHAFT ANGLE CDU from JDC 10704 step B.6(8)	deg		______			
(g)	SHAFT ANGLE CDU step B.1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+)			
				( ) (-) 120.000			
	ε TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B.1b	pulses		( )			
(g)	Encoder count step B.1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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JDC
NO. 10705
REV. B

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(3)	SHAFT ANGLE CDU from JDC 10704 step B.6(7)	deg		______			
(g)	SHAFT ANGLE CDU step B.1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+)			
				( ) (-) 185.000			
	ε TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B.1b	pulses		( )			
(g)	Encoder count step B.1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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JDC
NO. 10705
REV. B

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(4)	SHAFT ANGLE CDU from JDC 10704 step B.6(6)	deg		______			
(g)	SHAFT ANGLE CDU step B.1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+)			
				( ) (-) 212.000			
	ε TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B.1b	pulses		( )			
(g)	Encoder count step B.1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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JDC
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JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(5)	SHAFT ANGLE CDU from JDC 10704 step B. 6(5)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(–)			
	ΔCDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 268. 000			
	ΔTPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ΔENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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JDC
NO. 10705
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JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(6)	SHAFT ANGLE CDU from JDC 10704 step B. 6(4)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ΔCDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 315. 000			
	ΔTPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ΔENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(7)	SHAFT ANGLE CDU from JDC 10704 step B. 6(3)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ΔCDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 338. 000			
	ΔTPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ΔENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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EQUIPMENT TEST
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JDC
NO. 10705
REV. B

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(8)	SHAFT ANGLE CDU from JDC 10704 step B. 6(2)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ΔCDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 349. 000			
	ΔTPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ΔENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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NO. 10 05
REV. B

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(9)	SHAFT ANGLE CDU from JDC 10704 step B. 6(1)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ϵ CDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 000. 000			
	ϵ TPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ϵ ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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JDC
NO. 10705
REV. B

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(10)	SHAFT ANGLE CDU from JDC 10704 step B. 5(2)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ϵ CDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 011. 000			
	ϵ TPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ϵ ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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JDC
NO. 10705
REV. B

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(11)	SHAFT ANGLE CDU from JDC 10704 step B. 5(3)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ϵ CDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 022. 000			
	ϵ TPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ϵ ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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DATA SHEET 12 **OF** 18

JDC
NO. 10705
REV. B

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(12)	SHAFT ANGLE CDU from JDC 10704 step B. 5(4)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ϵ CDU DIALS-SCT	deg	-0. 171	( )	+0. 171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 045. 000			
	ϵ TPAC-SCT	deg	-0. 06	( )	+0. 06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ϵ ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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JDC
NO. 10705
REV. B

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(13)	SHAFT ANGLE CDU from JDC 10704 step B.5(5)	deg					
(g)	SHAFT ANGLE CDU step B.1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+)			
				( ) (-) 087.000			
	ε TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B.1b	pulses		( )			
(g)	Encoder count step B.1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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NO. 10705
REV. B

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(14)	SHAFT ANGLE CDU from JDC 10704 step B.5(6)	deg					
(g)	SHAFT ANGLE CDU step B.1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+)			
				( ) (-) 143.000			
	ε TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B.1b	pulses		( )			
(g)	Encoder count step B.1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(15)	SHAFT ANGLE CDU from JDC 10704 step B.5(7)	deg					
(g)	SHAFT ANGLE CDU step B.1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+)			
				( ) (-) 170.000			
	ε TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B.1b	pulses		( )			
(g)	Encoder count step B.1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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EQUIPMENT TEST
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JDC
NO. 10705
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JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(16)	SHAFT ANGLE CDU from JDC 10704 step B.5(8)	deg					
(g)	SHAFT ANGLE CDU step B.1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter Step B.1b	deg		(+)			
				( ) (-) 240.000			
	ε TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B.1b	pulses		( )			
(g)	Encoder count step B.1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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EQUIPMENT TEST
DATA SHEET 17 OF 18

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JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(17)	SHAFT ANGLE CDU from JDC 10704 step B.5(9)	deg					
(g)	SHAFT ANGLE CDU step B.1g	deg		(-)			
	ϵ CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+)			
				( ) (-) 265.000			
	ϵ TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B.1b	pulses		( )			
(g)	Encoder count step B.1g	pulses		(-) ( )			
	ϵ ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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EQUIPMENT TEST
DATA SHEET 18 OF 18

JDC
NO. 10705
REV. B

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(18)	SHAFT ANGLE CDU from JDC 10704 step B.5(1)	deg					
(g)	SHAFT ANGLE CDU step B.1g	deg		(-)			
	ϵ CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+)			
				( ) (-) 000.000			
	ϵ TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B.1b	pulses		( )			
(g)	Encoder count step B.1g	pulses		(-) ( )			
	ϵ ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

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Released with ATP 1009502

JOB SCT SHAFT ACCURACY TEST

JDC 10705 **REV.** ____ **PAGE** 1 **OF** 4

INITIAL TDRR 19956 **D.S. PGS** 15

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SCT shaft accuracy is checked by comparing the SCT panel shaft angle counter, SHAFT ANGLE CDU readout, and shaft encoder output with SXT shaft angles.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES ATP 1009502, Paragraphs 3-3.11 and 3-3.14.2
JDC 10704

IMPORTANT JDC 10704 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

OIA ON/ISS POWER DISABLED
OPTICS POWER ON
BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

ZERO OPTICS
CONTROLLER DIRECT
SCT DRIVE NORMAL
SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

TRACKER
TRACKER POWER.

5. Set switches as follows:

SHAFT SLEW CONTROL to OFF
TRUNNION SLEW CONTROL to OFF
SLAVE TELESCOPE to STAR LOS.

6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

7. Set the tilt axis of the Rotary Table to approximately 0°.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ________

JOB SCT SHAFT ACCURACY TEST

JDC 10705 **REV** **PAGE** 2 **OF** 4

SUBSYSTEM OPTICAL

ASSY

8. Install the Portable Light Assembly on the SXT eyepiece assembly and energize the Illuminator lamp. Set intensity switch for maximum intensity.

NOTE: The Phase Angle Voltmeter (PAVM), Illuminator lamp, and Counter shall have been energized for at least 15 minutes immediately prior to use.

9. Connect the SHAFT ANGLE CDU encoder output to the Counter by setting the COUNTER INPUT "A" OR "AB" selector on Primary Signal Selector panel to 17.

10. Set selectors on Counter to perform forward-reverse counting function as follows:

DISPLAY TIME (N_2) to 10^5
DISPLAY RESET to ZERO
CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to COUNT
INPUT SELECTOR to A-B
SENSE SELECTOR to FWD.

11. Use SHAFT SLEW CONTROL switch and FINE GAIN CONTROL on Remote Optics Controller to drive SHAFT ANGLE CDU while adjusting ATTEN, SLOPE, and TRIGGER switches and controls on channels A and B of the Counter.

12. Press the MANUAL/ZERO OPTICS pushbutton to light the ZERO OPTICS indicator.

13. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

14. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller to drive the 2X TRUNNION CDU to 114.000 (±0.005)° (57° LOS).

15. Connect SCT Shaft 1X resolver error signal to PAVM by setting Primary Signal Selector to 210.

16. Set the FREQUENCY switch on the PAVM to 800~ No. 1.

17. Press the RESET pushbutton on the Counter.

18. Adjust BRIGHTNESS control (inside the side access panel of the Remote Optics Controller) until the SCT reticle illumination is at a comfortable level.

DATE ________

JOB SCT SHAFT ACCURACY TEST

JDC 10705 **REV** **PAGE** 3 **OF** 4

SUBSYSTEM OPTICAL

ASSY

B. PROCEDURE

1. Perform the following steps for each of the SHAFT ANGLE CDU INDICATIONS listed in Table I:

NOTE: In step B.1.a, after the first (zero) setting, drive the SHAFT ANGLE CDU in the positive direction to the second setting (265.000). Thereafter, drive in the negative direction to each of the indicated settings except the last (zero) setting.

a. Drive the SHAFT ANGLE CDU to within ±0.003° of the indicated setting using the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller.

b. Record the Counter and SCT panel shaft angle counter indications.

c. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of the SCT shaft 1X resolver error signal.

d. Press the SCT DRIVE NORMAL/SCT DRIVE DISABLED pushbutton to light the SCT DRIVE DISABLED indicator.

e. While sighting through the SCT eyepiece, position the Retroreflecting Prism until the filaments in the Illuminator are visible.

f. With the Retroreflecting Prism carefully held in the position set in step B.1.e, remove the Illuminator from the SXT eyepiece and place it in the SCT eyepiece. Sight through the SXT eyepiece and use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to align the SXT reticle "R" line to the projected image of the SCT reticle "R" line.

g. Record the Counter and SHAFT ANGLE CDU indications.

h. Remove the Retroreflecting Prism and replace the Illuminator in the SXT eyepiece assembly.

i. Press the SCT DRIVE NORMAL/SCT DRIVE DISABLED pushbutton to light the SCT DRIVE NORMAL indicator.

j. Record the corresponding SHAFT ANGLE CDU indication from JDC 10704 as indicated on the data sheet, and perform the indicated calculations.

DATE ________

JOB SCT SHAFT ACCURACY TEST

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SUBSYSTEM OPTICAL

ASSY

Table I

SHAFT ANGLE CDU INDICATIONS

(1)	000.000
(2)	265.000
(3)	240.000
(4)	192.000
(5)	144.000
(6)	096.000
(7)	048.000
(8)	000.000
(9)	312.000
(10)	264.000
(11)	216.000
(12)	168.000
(13)	120.000
(14)	095.000
(15)	000.000

2. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 15

JDC
NO. 10705
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JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(5)	SHAFT ANGLE CDU from JDC 10704 step B.4(4)	deg		____			
(g)	SHAFT ANGLE CDU step B.1g	deg		(-) ____			
	Δ CDU DIALS-SCT	deg	-0.171	( ) ____	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+) ____			
				( ) ____ (-) 144.000			
	Δ TPAC-SCT	deg	-0.06	( ) ____	+0.06		
(b)	Encoder count step B.1b	pulses		( ) ____			
(g)	Encoder count step B.1g	pulses		(-) ( ) ____			
	Δ ENC-SCT	pulses	-16	( ) ____	+16		
(c)	1X resolver error in-phase	mv		( ) ____			
(c)	1X resolver error quadrature	mv		( ) ____			

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 15

JDC
NO. 10705
REV. ____

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(6)	SHAFT ANGLE CDU from JDC 10704 step B.4(3)	deg		____			
(g)	SHAFT ANGLE CDU step B.1g	deg		(-) ____			
	Δ CDU DIALS-SCT	deg	-0.171	( ) ____	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+) ____			
				( ) ____ (-) 096.000			
	Δ TPAC-SCT	deg	-0.06	( ) ____	+0.06		
(b)	Encoder count step B.1b	pulses		( ) ____			
(g)	Encoder count step B.1g	pulses		(-) ( ) ____			
	Δ ENC-SCT	pulses	-16	( ) ____	+16		
(c)	1X resolver error in-phase	mv		( ) ____			
(c)	1X resolver error quadrature	mv		( ) ____			

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 7 OF 15

JDC
NO. 10705
REV. ____

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(7)	SHAFT ANGLE CDU from JDC 10704 step B.4(2)	deg		____			
(g)	SHAFT ANGLE CDU step B.1g	deg		(-) ____			
	Δ CDU DIALS-SCT	deg	-0.171	( ) ____	+0.171		
(b)	Shaft Angle Counter step B.1b	deg		(+) ____			
				( ) ____ (-) 048.000			
	Δ TPAC-SCT	deg	-0.06	( ) ____	+0.06		
(b)	Encoder count step B.1b	pulses		( ) ____			
(g)	Encoder count step B.1g	pulses		(-) ( ) ____			
	Δ ENC-SCT	pulses	-16	( ) ____	+16		
(c)	1X resolver error in-phase	mv		( ) ____			
(c)	1X resolver error quadrature	mv		( ) ____			

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 15

JDC
NO. 10705
REV. ____

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(8)	SHAFT ANGLE CDU from JDC 10704 step B.4(1)	deg		____			
(g)	SHAFT ANGLE CDU step B.1g	deg		(-) ____			
	Δ CDU DIALS-SCT	deg	-0.171	( ) ____	+0.171		
(b)	Shaft Angle Countor step B.1b	deg		(+) ____			
				( ) ____ (-) 000.000			
	Δ TPAC-SCT	deg	-0.06	( ) ____	+0.06		
(b)	Encoder count step B.1b	pulses		( ) ____			
(g)	Encoder count step B.1g	pulses		(-) ( ) ____			
	Δ ENC-SCT	pulses	-16	( ) ____	+16		
(c)	1X resolver error in-phase	mv		( ) ____			
(c)	1X resolver error quadrature	mv		( ) ____			

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 **OF** 15

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NO 10705
REV

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(9)	SHAFT ANGLE CDU from JDC 10704 step B. 5(2)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 312.000			
	ε TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 **OF** 15

JDC
NO. 10705
REV.

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(10)	SHAFT ANGLE CDU from JDC 10704 step B. 5(3)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 264.000			
	ε TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 **OF** 15

JDC
NO. 10705
REV.

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(11)	SHAFT ANGLE CDU from JDC 10704 step B. 5(4)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 216.000			
	ε TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 12 **OF** 15

JDC
NO. 10705
REV.

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(12)	SHAFT ANGLE CDU from JDC 10704 step B. 5(5)	deg					
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-)			
	ε CDU DIALS-SCT	deg	-0.171	( )	+0.171		
(b)	Shaft Angle Counter step B. 1b	deg		(+)			
				( ) (-) 168.000			
	ε TPAC-SCT	deg	-0.06	( )	+0.06		
(b)	Encoder count step B. 1b	pulses		( )			
(g)	Encoder count step B. 1g	pulses		(-) ( )			
	ε ENC-SCT	pulses	-16	( )	+16		
(c)	1X resolver error in-phase	mv		( )			
(c)	1X resolver error quadrature	mv		( )			

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 13 **OF** 15

JDC
NO 10705
REV ____

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(13)	SHAFT ANGLE CDU from JDC 10704 step B. 5(6)	deg		____			
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-) ____			
	« CDU DIALS-SCT	deg	-0.171	( ) ____	+0.171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ____			
				( ) ____ (-) 120.000			
	« TPAC-SCT	deg	-0.06	( ) ____	+0.06		
(b)	Encoder count step B. 1b	pulses		( ) ____			
(g)	Encoder count step B. 1g	pulses		(-) ( ) ____			
	« ENC-SCT	pulses	-16	( ) ____	+16		
(c)	1X resolver error in-phase	mv		( ) ____			
(c)	1X resolver error quadrature	mv		( ) ____			

DATE ____

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EQUIPMENT TEST
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JDC
NO. 10705
REV. ____

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(14)	SHAFT ANGLE CDU from JDC 10704 step B. 5(7)	deg		____			
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-) ____			
	« CDU DIALS-SCT	deg	-0.171	( ) ____	+0.171		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ____			
				( ) ____ (-) 095.000			
	« TPAC-SCT	deg	-0.06	( ) ____	+0.06		
(b)	Encoder count step B. 1b	pulses		( ) ____			
(g)	Encoder count step B. 1g	pulses		(-) ( ) ____			
	« ENC-SCT	pulses	-16	( ) ____	+16		
(c)	1X resolver error in-phase	mv		( ) ____			
(c)	1X resolver error quadrature	mv		( ) ____			

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 15 **OF** 15

JDC
NO. 10705
REV. ____

JOB SCT SHAFT ACCURACY TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(15)	SHAFT ANGLE CDU from JDC 10704 step B. 4(1)	deg		____			
(g)	SHAFT ANGLE CDU step B. 1g	deg		(-) ____			
	« CDU DIALS-SCT	deg	-0.171	( ) ____	+0.17		
(b)	Shaft Angle Counter step B. 1b	deg		(+) ____			
				( ) ____ (-) 000.000			
	« TPAC-SCT	deg	-0.06	( ) ____	+0.06		
(b)	Encoder count step B. 1b	pulses		( ) ____			
(g)	Encoder count step B. 1g	pulses		(-) ( ) ____			
	« ENC-SCT	pulses	-16	( ) ____	+16		
(c)	1X resolver error in-phase	mv		( ) ____			
(c)	1X resolver error quadrature	mv		( ) ____			

DATE ____

Released with ATP 1009502

JOB OPTICS TO TARGET ALIGNMENT

JDC 10706 **REV.** A **PAGE** 1 **OF** 2
INITIAL TDRR 19950 **D.S. PGS** 1

SUBSYSTEM OPTICAL
ASSY.
DESCRIPTION Align SXT LLOS to 5-inch autocollimator to provide reference point for angular measurements.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-1-65	22220	All	-	WK	TM

REFERENCES ATP 1009502, Paragraph 5-1
JDC 10734

IMPORTANT JDC 10702 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PROCEDURE

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

    OIA ON
    OPTICS POWER ON
    BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

    ZERO OPTICS
    CONTROLLER DIRECT
    SCT DRIVE NORMAL
    SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

    TRACKER
    TRACKER POWER.

5. Set switches as follows:

    SHAFT SLEW CONTROL to OFF
    TRUNNION SLEW CONTROL to OFF
    SLAVE TELESCOPE to STAR LOS.

6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

7. Use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ______

JOB OPTICS TO TARGET ALIGNMENT **JDC** 10706 **REV** A **PAGE** 2 **OF** 2

SUBSYSTEM OPTICAL **ASSY**

8. Use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the 2X TRUNNION CDU to approximately 20.000.

    NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, offsetting the vernier knob before each reading.

9. Set the tilt axis angle of the Rotary Table to 0° 00' 00" (±1").

    NOTE: After performing step A.10, do not adjust the Optics/NB Mtg. Fixture from its final position.

10. Sight through SXT LLOS into the 5-inch autocollimator while adjusting the Optics/NB Mtg. Fixture about its tilt axis using the cradle adjust knob and the Rotary Table about its rotary axis until the autocollimator reticle is aligned in the center of the SXT reticle. Record the Rotary Table rotary axis indication.

11. Drive the Rotary Table through approximately five degrees in the decreasing direction.

12. Sight through SXT LLOS while adjusting the Rotary Table about its rotary axis until the 5-inch autocollimator reticle is aligned in the center of the SXT reticle. Record the Rotary Table rotary axis indication.

13. Repeat steps A.11 and A.12.

14. Calculate the average of the three Rotary Table rotary axis indications obtained in steps A.10, A.12, and A.13.

15. If the average value calculated in step A.14 does not differ from any one of the three individual indications by more than 3 arc seconds, record this average value as the Rotary Table Zero Reference Position (ZRP). If it does, repeat the entire procedure.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 **OF** 1

JDC
NO. 10706
REV. A
INITIAL TDRR 19950

JOB OPTICS TO TARGET ALIGNMENT

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY
DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ____ CAL DATE
NAME ______ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
A.10	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
A.12	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
A.13 (A.12)	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
A.15	Rotary Table Zero Reference Position (ZRP)	deg min sec	▨	° ' "	▨	▨	▨

DATE ______

Released with ATP 1009502

JOB OPTICS TO TARGET ALIGNMENT

JDC 10706 **REV.** ____ **PAGE** 1 **OF** 2

INITIAL TDRR 19950 **D.S. PGS** 1

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION Align SXT LLOS to 5-inch autocollimator to provide reference point for angular measurements.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES ATP 1009502, Paragraph 5-1
JDC 10734

IMPORTANT JDC 10702 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PROCEDURE

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

   OIA ON/ISS POWER DISABLED
   OPTICS POWER ON
   BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

   ZERO OPTICS
   CONTROLLER DIRECT
   SCT DRIVE NORMAL
   SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

   TRACKER
   TRACKER POWER.

5. Set switches as follows:

   SHAFT SLEW CONTROL to OFF
   TRUNNION SLEW CONTROL to OFF
   SLAVE TELESCOPE to STAR LOS.

6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

7. Use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** ________

JOB OPTICS TO TARGET ALIGNMENT

JDC 10706 **REV** **PAGE** 2 **OF** 2

SUBSYSTEM OPTICAL

ASSY

8. Use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the 2X TRUNNION CDU to approximately 20.000.

   NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, offsetting the vernier knob before each reading.

9. Set the tilt axis angle of the Rotary Table to 0° 00' 00" (±1").

   NOTE: After performing step A.9, do not adjust the Optics/NB Mtg. Fixture from its final position.

10. Sight through SXT LLOS into the 5-inch autocollimator while adjusting the Optics/NB Mtg. Fixture about its tilt axis using the cradle adjust knob and the Rotary Table about its rotary axis until the autocollimator reticle is aligned in the center of the SXT reticle. Record the Rotary Table rotary axis indication.

11. Drive the Rotary Table through approximately five degrees in the decreasing direction.

12. Sight through SXT LLOS while adjusting the Rotary Table about its rotary axis until the 5-inch autocollimator reticle is aligned in the center of the SXT reticle. Record the Rotary Table rotary axis indication.

13. Repeat steps A.11 and A.12.

14. Calculate the average of the three Rotary Table rotary axis indications obtained in steps A.10, A.12, and A.13.

15. If the average value calculated in step A.14 does not differ from any one of the three individual indications by more than 3 arc seconds, record this average value as the Rotary Table Zero Reference Position (ZRP). If it does, repeat the entire procedure.

DATE ________

FORM 00109A
Chg. 5/12/64

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC NO. 10706
REV. ______
INITIAL TDRR 19950

JOB OPTICS TO TARGET ALIGNMENT

ASSEMBLY UNDER TEST

TITLE ________________

SER. NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION

TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________________ SER. NO. ________ CAL DATE ________

NAME ________________ SER. NO. ________ CAL DATE ________

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
A.10	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
A.12	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
A.13 (A.12)	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
A.15	Rotary Table Zero Reference Position (ZRP)	deg min sec	▨	° ' "	▨	▨	▨

DATE ________

Released with ATP 1009502
JOB RESOLUTION CHECK

JDC 10707 REV. A PAGE 1 OF 3
INITIAL TDRR 19950 D.S. PGS 1

SUBSYSTEM OPTICAL
ASSY.
DESCRIPTION Resolution capability of the SXT and SCT is checked by viewing autocollimator resolution targets.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D. S.	MIT	NASA
A	9-1-65	22221	1	-	WK	TM

REFERENCES ATP 1009502, Paragraph 3-3.18, JDC 10734

IMPORTANT JDC 10702 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:
   OIA ON
   OPTICS POWER ON
   BLOCK I SERIES 100.

3. Assure that the following pushbuttons and indicators on the Remote Optics Controller are lighted.
   ZERO OPTICS
   CONTROLLER DIRECT
   SCT DRIVE NORMAL
   SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:
   TRACKER
   TRACKER POWER.

5. Set switches as follows:
   SLAVE TELESCOPE to STAR LOS
   COARSE GAIN CONTROL to HI
   SHAFT SLEW CONTROL to OFF
   TRUNNION SLEW CONTROL to OFF.

6. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the MANUAL indicator.

7. Use the SHAFT SLEW CONTROL switch and the FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB RESOLUTION CHECK
JDC 10707 REV A PAGE 2 OF 3

SUBSYSTEM OPTICAL
ASSY

B. PROCEDURE

NOTE: It is recommended that an optical magnifying device, such as a dioptometer, be used in conjunction with the SCT eyepiece for viewing the SCT resolution patterns. If none of the resolution patterns can be resolved, enter "none" on the data sheet.

1. Position the Rotary Table such that the resolution targets are approximately centered in the fields of view of the SXT and SCT.

2. Sight through the SXT StLOS, then SXT LLOS and then the SCT LOS. In each case, record the number of the smallest wholly clear and distinct pattern.

3. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately 1/3 field radius in the SXT field of view.

NOTE: A rotation of approximately 18 minutes about the rotary axis of the Rotary Table will move the reticle pattern 1/3 of the field radius of the SXT field of view.

4. Sight through the SXT StLOS and then the SXT LLOS. In each case record the number of the smallest wholly clear and distinct pattern.

5. Position the Rotary Table such that the 5-inch autocollimator reticle is located at approximately 2/3 field radius in the SXT field of view.

6. Sight through the SXT StLOS and then the SXT LLOS. In each case record the number of the smallest wholly clear and distinct pattern.

7. Use the TRUNNION SLEW CONTROL switch and the FINE GAIN CONTROL to drive the 2X TRUNNION CDU to 60.000 (±0.005)°.

8. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately the center of the SXT field of view.

9. Sight through the SXT StLOS. Record the number of the smallest wholly clear and distinct pattern.

10. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately 1/3 field radius in the SXT field of view.

11. Sight through the SXT StLOS. Record the number of the smallest wholly clear and distinct pattern.

12. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately 2/3 field radius in the SXT field of view.

DATE ______

JOB RESOLUTION CHECK
JDC 10707 REV A PAGE 3 OF 3

SUBSYSTEM OPTICAL
ASSY

13. Sight through the SXT StLOS. Record the number of the smallest wholly clear and distinct pattern.

14. Use the TRUNNION SLEW CONTROL switch and the FINE GAIN CONTROL to drive the 2X TRUNNION CDU to 114.000 (±0.005)°.

15. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately the center of the SXT field of view.

16. Sight through the SXT StLOS. Record the number of the smallest wholly clear and distinct pattern.

17. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately 1/3 field radius in the SXT field of view.

18. Sight through the SXT StLOS. Record the number of the smallest wholly clear and distinct pattern.

19. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately 2/3 field radius in the SXT field of view.

20. Sight through the SXT StLOS. Record the number of the smallest wholly clear and distinct pattern.

21. Use the TRUNNION SLEW CONTROL switch and the FINE GAIN CONTROL to drive the 2X TRUNNION CDU to 000.000 (±0.005)°.

22. Position the Rotary Table such that the 2-1/2-inch autocollimator reticle is located at approximately 1/3 field radius in the SCT field of view.

23. Sight through the SCT LOS. Record the number of the smallest wholly clear and distinct pattern.

24. Position the Rotary Table such that the 2-1/2-inch autocollimator reticle is located at approximately 2/3 field radius in the SCT field of view.

25. Sight through the SCT LOS. Record the number of the smallest wholly clear and distinct pattern.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC NO. 10707
REV. A
INITIAL TDRR 19950

JOB RESOLUTION CHECK

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ ______ CAL DATE
NAME ______ SER. NO. ______ ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	LOS OBSERVED	PATTERN POSITION IN FIELD OF VIEW	MINIMUM RESOLUTION (ARC SEC)	NUMBER OF SMALLEST CLEAR PATTERN	REJ	ACC
B.2	SXT StLOS	Centered	10			
	SXT LLOS	Centered	10			
	SCT LOS	Centered	▨		▨	▨
B.4	SXT StLOS	1/3 Field radius	15			
	SXT LLOS	1/3 Field radius	15			
B.6	SXT StLOS	2/3 Field radius	▨		▨	▨
	SXT LLOS	2/3 Field radius	▨		▨	▨
B.9	SXT StLOS	Centered	10			
B.11	SXT StLOS	1/3 Field radius	15			
B.13	SXT StLOS	2/3 Field radius	▨		▨	▨
B.16	SXT StLOS	Centered	10			
B.18	SXT StLOS	1/3 Field radius	15			
B.20	SXT StLOS	2/3 Field radius	▨		▨	▨
B.23	SCT LOS	1/3 Field radius	▨		▨	▨
B.25	SCT LOS	2/3 Field radius	▨		▨	▨

DATE ______

Released with ATP 1009502
JOB RESOLUTION CHECK

JDC 10707 REV. ____ PAGE 1 OF 3
INITIAL TDRR 19950 D.S. PGS 1

SUBSYSTEM OPTICAL
ASSY.

DESCRIPTION Resolution capability of the SXT and SCT is checked by viewing autocollimator resolution targets.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES ATP 1009502, Paragraph 3-3.18, JDC 10734

IMPORTANT JDC 10702 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.
2. Assure that the following pushbuttons on the Test Control panel are lighted:
   OIA ON/ISS POWER DISABLED
   OPTICS POWER ON
   BLOCK I SERIES 100.
3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted.
   ZERO OPTICS
   CONTROLLER DIRECT
   SCT DRIVE NORMAL
   SXT DRIVE NORMAL.
4. Assure that the following pushbuttons are not lighted:
   TRACKER
   TRACKER POWER
5. Set switches as follows:
   SLAVE TELESCOPE to STAR LOS.
   COARSE GAIN CONTROL to HI
   SHAFT SLEW CONTROL to OFF
   TRUNNION SLEW CONTROL to OFF.
6. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on the Remote Optics Controller to light the MANUAL indicator.
7. Use the SHAFT SLEW CONTROL switch and the FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB RESOLUTION CHECK
JDC 10707 REV PAGE 2 OF 3
SUBSYSTEM OPTICAL
ASSY

B. PROCEDURE

NOTE: It is recommended that an optical magnifying device, such as a dioptometer, be used in conjunction with the SCT eyepiece for viewing the SCT resolution patterns. If none of the resolution patterns can be resolved, enter "none" on the data sheet.

1. Position the Rotary Table such that the resolution targets are approximately centered in the fields of view of the SXT and SCT.
2. Sight through the SXT StLOS, then SXT LLOS and then the SCT LOS. In each case, record the number of the smallest wholly clear and distinct pattern.
3. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately 1/3 field radius in the SXT field of view.

   NOTE: A rotation of approximately 18 minutes about the rotary axis of the Rotary Table will move the reticle pattern 1/3 of the field radius of the SXT field of view.
4. Sight through the SXT StLOS and then the SXT LLOS. In each case record the number of the smallest wholly clear and distinct pattern.
5. Position the Rotary Table such that the 5-inch autocollimator reticle is located at approximately 2/3 field radius in the SXT field of view.
6. Sight through the SXT StLOS and then the SXT LLOS. In each case record the number of the smallest wholly clear and distinct pattern.
7. Use the TRUNNION SLEW CONTROL switch and the FINE GAIN CONTROL to drive the 2X TRUNNION CDU to 60.000 (±0.005)°.
8. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately the center of the SXT field of view.
9. Sight through the SXT StLOS. Record the number of the smallest wholly clear and distinct pattern.
10. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately 1/3 field radius in the SXT field of view.
11. Sight through the SXT StLOS. Record the number of the smallest wholly clear and distinct pattern.
12. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately 2/3 field radius in the SXT field of view.

DATE ______

JOB RESOLUTION CHECK
JDC 10707 REV PAGE 3 OF 3
SUBSYSTEM OPTICAL
ASSY

13. Sight through the SXT StLOS. Record the number of the smallest wholly clear and distinct pattern.
14. Use the TRUNNION SLEW CONTROL switch and the FINE GAIN CONTROL to drive the 2X TRUNNION CDU to 114.000 (±0.005)°.
15. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately the center of the SXT field of view.
16. Sight through the SXT StLOS. Record the number of the smallest wholly clear and distinct pattern.
17. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately 1/3 field radius in the SXT field of view.
18. Sight through the SXT StLOS. Record the number of the smallest wholly clear and distinct pattern.
19. Position the Rotary Table such that the 5-inch autocollimator reticle pattern is located at approximately 2/3 field radius in the SXT field of view.
20. Sight through the SXT StLOS. Record the number of the smallest wholly clear and distinct pattern.
21. Use the TRUNNION SLEW CONTROL switch and the FINE GAIN CONTROL to drive the 2X TRUNNION CDU to 000.000 (±0.005)°.
22. Position the Rotary Table such that the 2-1/2-inch autocollimator reticle is located at approximately 1/3 field radius in the SCT field of view.
23. Sight through the SCT LOS. Record the number of the smallest wholly clear and distinct pattern.
24. Position the Rotary Table such that the 2-1/2-inch autocollimator reticle is located at approximately 2/3 field radius in the SCT field of view.
25. Sight through the SCT LOS. Record the number of the smallest wholly clear and distinct pattern.

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 1

JDC NO. 10707
REV. ______
INITIAL TDRR 19950

JOB RESOLUTION CHECK

ASSEMBLY UNDER TEST
TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY
DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	LOS OBSERVED	PATTERN POSITION IN FIELD OF VIEW	MINIMUM RESOLUTION (ARC SEC)	NUMBER OF SMALLEST CLEAR PATTERN	REJ	ACC
B.2	SXT StLOS	Centered	10			
	SXT LLOS	Centered	10			
	SCT LOS	Centered	▨		▨	▨
B.4	SXT StLOS	1/3 Field radius	15			
	SXT LLOS	1/3 Field radius	15			
B.6	SXT StLOS	2/3 Field radius	▨		▨	▨
	SXT LLOS	2/3 Field radius	▨		▨	▨
B.9	SXT StLOS	Centered	10			
B.11	SXT StLOS	1/3 Field radius	15			
B.13	SXT StLOS	2/3 Field radius	▨		▨	▨
B.16	SXT StLOS	Centered	10			
B.18	SXT StLOS	1/3 Field radius	15			
B.20	SXT StLOS	2/3 Field radius	▨		▨	▨
B.23	SCT LOS	1/3 Field radius	▨		▨	▨
B.25	SCT LOS	2/3 Field radius	▨		▨	▨

DATE ______

Released with ATP 1009502

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC 10708 REV. A PAGE 1 OF 3
INITIAL TDRR 19950 D.S. PGS 3

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SXT LOS parallelism checked by comparing alignment of SXT LLOS and SXT STLOS to autocollimator LOS. SXT-SCT centerline parallelism is also checked by determining SXT STLOS and SCT LOS parallelism.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-1-65	22222	1	-	WK-JKH	TM-JKH

REFERENCES ATP 1009502, paragraph 3-3.4, 3-3.6, 3-3.9 JDC's 10703, 10706

IMPORTANT JDC's 10703 and 10706 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.
2. Assure that the following pushbuttons on the TEST CONTROL panel are lighted:

    OIA ON
    OPTICS POWER ON
    BLOCK I SERIES 100.

    NOTE: The two autocollimator reticle lamps shall have been energized for at least 15 minutes immediately prior to use in this test.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

    ZERO OPTICS
    CONTROLLER DIRECT
    SCT DRIVE NORMAL
    SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

    TRACKER
    TRACKER POWER.

5. Set switches as follows:

    SHAFT SLEW CONTROL to OFF
    TRUNNION SLEW CONTROL to OFF
    SLAVE TELESCOPE to STAR LOS.

6. Record the 2X Trunnion CDU dial indication.
7. Press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE ________

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC 10708 REV A PAGE 2 OF 3

SUBSYSTEM OPTICAL

ASSY

8. Use the SHAFT SLEW CONTROL switch and the COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.
9. Assure that the 2X TRUNNION CDU has not changed from the value recorded in step A.6. Use the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROL to adjust the 2X TRUNNION CDU if necessary.

B. PROCEDURE

NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, offsetting the vernier knob before each reading.

1. Cover SXT LLOS and sight through St LOS into the 5-inch autocollimator while adjusting the Rotary Table rotary and tilt axes until the autocollimator reticle is aligned in the center of the SXT reticle.
2. Record the Rotary Table rotary axis indication.
3. Record the Rotary Table tilt axis indication.
4. Sight through SCT into the 2-1/2-inch autocollimator while adjusting the Rotary Table rotary and tilt axes until the autocollimator reticle is aligned in the center of the SCT reticle.
5. Record the Rotary Table rotary axis indication.
6. Record the Rotary Table tilt axis indication.

C. CALCULATIONS

1. Subtract the Rotary Table ZRP (from JDC 10706) from the Rotary Table rotary axis indication recorded in step B.2. Record the difference, including sign, as $\epsilon_{(ST-L)Y}$.
2. Subtract $\epsilon_{(ST-L)Y}$ from the value recorded as ϵ_{STY} in JDC 10703. Record the difference, including sign, as ϵ_{LY}.
3. Subtract the Rotary Table tilt axis indication recorded in step B.3 from the Rotary Table tilt axis ZRP of 0° 00' 00" (or 360° 00' 00", whichever yields a smaller value). Record the difference including sign, as $\epsilon_{(ST-L)X}$.
4. Subtract $\epsilon_{(ST-L)X}$ from the value recorded as ϵ_{STX} in JDC 10703. Record the difference, including sign, as ϵ_{LX}.
5. Subtract the Rotary Table rotary axis indication recorded in step B.5 from the indication recorded in step B.2. Record the difference, including sign, as $\epsilon_{(ST-SCT)Y}$.

DATE ________

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC 10708 REV A PAGE 3 OF 3

SUBSYSTEM OPTICAL

ASSY

6. Subtract the Rotary Table tilt axis indication recorded in step B.3 from the indication recorded in step B.6. Record the difference, including sign, as $\epsilon_{(ST-SCT)X}$.

    NOTE: Symbols are defined as follows (With the Optical Subsystem set to the ZERO OPTICS mode):

    ϵ_{LX}: Angle from the Z_{nb} axis to the SXT LLOS about the X_{nb} axis.

    ϵ_{LY}: Angle from the Z_{nb} axis to the SXT LLOS about the Y_{nb} axis.

    $\epsilon_{(ST-L)X}$: Angle from the SXT LLOS to the SXT StLOS about the X_{nb} axis.

    $\epsilon_{(ST-L)Y}$: Angle from the SXT LLOS to the SXT StLOS about the Y_{nb} axis.

    $\epsilon_{(ST-SCT)X}$: Angle from the SCT LOS to the SXT StLOS about the X_{nb} axis.

    $\epsilon_{(ST-SCT)Y}$: Angle from the SCT LOS to the SXT StLOS about the Y_{nb} axis.

DATE ________

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 1 OF 3

JDC NO. 10708
REV. A
INITIAL TDRR 19950

JOB LINE-OF-SIGHT PARALLELISM CHECK

ASSEMBLY UNDER TEST

TITLE ________

SER. NO. ________ DWG ________ REV. ____

TEST HISTORY

DATE ________ START ________ END ________ SITE / LOCATION

TIME ________ START ________ END ________ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ________ SER. NO. ________ ________ CAL DATE

NAME ________ SER. NO. ________ ________ CAL DATE

CONDUCTED BY ________ NAME/AFFILIATION APPROVED BY ________ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
A.6	2X TRUNNION CDU	deg	▨	________	▨	▨	▨
B.2	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
B.3	Rotary Table tilt axis	deg min sec	▨	° ' "	▨	▨	▨
B.5	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
B.6	Rotary Table tilt axis	deg min sec	▨	° ' "	▨	▨	▨

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 3

JDC
NO. 10708
REV. A

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
C.1	Value from step B.2	deg min sec	▨	° ′ ″	▨	▨	▨
	Rotary Table ZRP (JDC 10706)	deg min sec	▨	° ′ ″ (-)	▨	▨	▨
	$\epsilon(ST-L)_Y$	sec	-10	( ) ″	+10		
C.2	ϵST_Y (JDC 10703)	sec	▨	( ) ′ ″	▨	▨	▨
	$\epsilon(ST-L)_Y$ (step C.1)	sec	▨	(-)( ) ″	▨	▨	▨
	ϵL_Y	sec	-26	( ) ″	+26		
C.3	Rotary Table tilt axis ZRP	deg min sec	▨	0° 00′ 00″ or 360° 00′ 00″	▨	▨	▨
	Value from step B.3	deg min sec	▨	(-)	▨	▨	▨
	$\epsilon(ST-L)_X$	sec	-20	( )	+20		
C.4	ϵST_X (JDC 10703)	sec	▨	( ) ″	▨	▨	▨
	$\epsilon(ST-L)_X$ (step C.3)	sec	▨	(-)( ) ″	▨	▨	▨
	ϵL_X	sec	-26	( ) ″	+26		

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 **OF** 3

JDC
NO. 10708
REV. A

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
C.5	Value from step B.2	deg min sec	▨	° ′ ″	▨	▨	▨
	Value from step B.5	deg min sec	▨	° ′ ″ (-)	▨	▨	▨
	$\epsilon(ST-SCT)_Y$	min	-6	( ) ′ ″	+6		
C.6	Value from step B.6	deg min sec	▨	° ′ ″	▨	▨	▨
	Value from step B.3	deg min sec	▨	° ′ ″ (-)	▨	▨	▨
	$\epsilon(ST-SCT)_X$	min	-3	( ) ′ ″	+3		

DATE ________

Released with ATP 1009502

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC 10708 **REV.** B **PAGE** 1 **OF** 3

INITIAL TDRR 19950 **D.S. PGS** 3

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SXT LOS parallelism checked by comparing alignment of SXT LLOS and SXT STLOS to autocollimator LOS. SXT-SCT centerline parallelism is also checked by determining SXT STLOS and SCT LOS parallelism.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-1-65	22222	1	-	WK	TM
B	10-26-65	23506	All	All	WK	ACM

REFERENCES ATP 1009502, paragraph 3-3.4, 3-3.6, 3-3.9 JDC's 10703

IMPORTANT JDC's 10703 and 10706 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the TEST CONTROL panel are lighted:

OIA ON
OPTICS POWER ON
BLOCK I SERIES 100.

NOTE: The two autocollimator reticle lamps shall have been energized for at least 15 minutes immediately prior to use in this test.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

ZERO OPTICS
CONTROLLER DIRECT
SCT DRIVE NORMAL
SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

TRACKER
TRACKER POWER.

5. Set switches as follows:

SHAFT SLEW CONTROL to OFF
TRUNNION SLEW CONTROL to OFF
SLAVE TELESCOPE to STAR LOS.

6. Record the 2X Trunnion CDU dial indication.

7. Press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

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8. Use the SHAFT SLEW CONTROL switch and the COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.

9. Assure that the 2X TRUNNION CDU has not changed from the value recorded in step A.6. Use the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROL to adjust the 2X TRUNNION CDU if necessary.

B. PROCEDURE

NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, offsetting the vernier knob before each reading.

1. Cover SXT StLOS and sight through LLOS into the 5-inch autocollimator while adjusting the Rotary Table and tilt axes until the autocollimator reticle is aligned in the center of the SXT reticle.

2. Record the Rotary Table rotary axis indication.

3. Record the Rotary Table tilt axis indication.

4. Cover SXT LLOS and sight through St LOS into the 5-inch autocollimator while adjusting the Rotary Table rotary and tilt axes until the autocollimator reticle is aligned in the center of the SXT reticle.

5. Record the Rotary Table rotary axis indication.

6. Record the Rotary Table tilt axis indication.

7. Sight through SCT into the 2-1/2 inch autocollimator while adjusting the Rotary Table rotary and tilt axes until the autocollimator reticle is aligned in the center of the SCT reticle.

8. Record the Rotary Table rotary axis indication.

9. Record the Rotary Table tilt axis indication.

C. CALCULATIONS

1. Subtract the Rotary Table rotary axis indication recorded in step B.2 from the Rotary Table rotary axis indication recorded in step B.5. Record the difference, including sign as $\epsilon_{(ST-L)Y}$.

2. Subtract $\epsilon_{(ST-L)Y}$ from the value recorded as ϵ_{STY} in JDC 10703. Record the difference, including sign, as ϵ_{LY}.

3. Subtract the Rotary Table tilt axis indication recorded in step B.6 from the Rotary Table tilt axis indication recorded in step B.3. Record the difference including sign, as $\epsilon_{(ST-L)X}$.

4. Subtract $\epsilon_{(ST-L)X}$ from the value recorded as ϵ_{STX} in JDC 10703. Record the difference, including sign, as ϵ_{LX}.

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5. Subtract the Rotary Table rotary axis indication recorded in step B.8 from the indication recorded in step B.5. Record the difference, including sign, as $\epsilon_{(ST-SCT)Y}$.

6. Subtract the Rotary Table tilt axis indication recorded in step B.6 from the indication recorded in step B.9. Record the difference, including sign, as $\epsilon_{(ST-SCT)X}$.

NOTE: Symbols are defined as follows (With the Optical Subsystem set to the ZERO OPTICS mode):

ϵ_{LX}; Angle from the Z_{nb} axis to the SXT LLOS about the X_{nb} axis.

ϵ_{LY}; Angle from the Z_{nb} axis to the SXT LLOS about the Y_{nb} axis.

$\epsilon_{(ST-L)X}$; Angle from the SXT LLOS to the SXT StLOS about the X_{nb} axis.

$\epsilon_{(ST-L)Y}$; Angle from the SXT LLOS to the SXT StLOS about the Y_{nb} axis.

$\epsilon_{(ST-SCT)X}$; Angle from the SCT LOS to the SXT StLOS about the X_{nb} axis.

$\epsilon_{(ST-SCT)Y}$; Angle from the SCT LOS to the SXT StLOS about the Y_{nb} axis.

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EQUIPMENT TEST
DATA SHEET 1 **OF** 3

NO. 10708 **JDC**
REV. B
INITIAL TDRR 19950

JOB LINE-OF-SIGHT PARALLELISM CHECK

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
A.6	2X TRUNNION CDU	deg	▨	______	▨		
B.2	Rotary Table rotary axis	deg min sec	▨	° ' " ______	▨		
B.3	Rotary Table tilt axis	deg min sec	▨	° ' " ______	▨		
B.5	Rotary Table rotary axis	deg min sec	▨	° ' " ______	▨		
B.6	Rotary Table tilt axis	deg min sec	▨	° ' " ______	▨		
B.8	Rotary Table rotary axis	deg min sec	▨	° ' " ______	▨		
B.9	Rotary Table tilt axis	deg min sec	▨	° ' " ______	▨		

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 3

JDC
NO. 10708
REV. B

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
C. 1	Value from step B. 5	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B. 2	deg min sec	▨	(-) ° ' "	▨	▨	▨
	$\epsilon(ST-L)_Y$	$\widehat{sec}$	-10	( ) "	+10		
C. 2	ϵST_Y (JDC 10703)	$\widehat{sec}$	▨	( ) ' "	▨	▨	▨
	$\epsilon(ST-L)_Y$ (step C. 1)	$\widehat{sec}$	▨	(-)( ) "	▨	▨	▨
	ϵL_Y	$\widehat{sec}$	-26	( ) "	+26		
C. 3	Value from step B. 3	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B. 6	deg min sec	▨	(-)	▨	▨	▨
	$\epsilon(ST-L)_X$	$\widehat{sec}$	-20	( )	+20		
C. 4	ϵST_X (JDC 10703)	$\widehat{sec}$	▨	( ) "	▨	▨	▨
	$\epsilon(ST-L)_X$ (step C. 3)	$\widehat{sec}$	▨	(-)( ) "	▨	▨	▨
	ϵL_X	$\widehat{sec}$	-26	( ) "	+26		

DATE 11 JUN 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 **OF** 3

JDC
NO. 10708
REV. B

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
C. 5	Value from step B. 5	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B. 8	deg min sec	▨	(-) ° ' "	▨	▨	▨
	$\epsilon(ST-SCT)_Y$	$\widehat{min}$	-6	( ) ' "	+6		
C. 6	Value from step B. 9	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B. 6	deg min sec	▨	(-) ° ' "	▨	▨	▨
	$\epsilon(ST-SCT)_X$	$\widehat{min}$	-3	( ) ' "	+3		

DATE 11 JUN 65

Released with ATP 1009502

JOB LINE-OF-SIGHT PARALLELISM CHECK | **JDC** 10708 **REV.** C **PAGE** 1 **OF** 3 | **INITIAL TDRR** 19950 **D.S. PGS** 3

SUBSYSTEM OPTICAL | **ASSY.**

DESCRIPTION SXT LOS parallelism checked by comparing alignment of SXT LLOS and SXT STLOS to autocollimator LOS. SXT-SCT centerline parallelism is also checked by determining SXT STLOS and SCT LOS parallelism.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-1-65	22222	1	-	WK	TM
B	10-26-65	23506	All	All	WK	ACM
C	1-19-67	32691	1, 2	2	EA	-

REFERENCES ATP 1009502, paragraph 3-3.4, 3-3.6, 3-3.9 JDC's 10703 and 19128

IMPORTANT JDC 10703 shall have been performed. Insure that JDC 19128 has been performed within the last six months.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the TEST CONTROL panel are lighted:

OIA ON
OPTICS POWER ON
BLOCK I SERIES 100.

NOTE: The two autocollimator reticle lamps shall have been energized for at least 15 minutes immediately prior to use in this test.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

ZERO OPTICS
CONTROLLER DIRECT
SCT DRIVE NORMAL
SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

TRACKER
TRACKER POWER.

5. Set switches as follows:

SHAFT SLEW CONTROL to OFF
TRUNNION SLEW CONTROL to OFF
SLAVE TELESCOPE to STAR LOS.

6. Record the 2X Trunnion CDU dial indication.

7. Press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

JOB LINE-OF-SIGHT PARALLELISM CHECK | JDC 10708 REV C PAGE 2 OF 3

SUBSYSTEM OPTICAL | ASSY

8. Use the SHAFT SLEW CONTROL switch and the COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.

9. Assure that the 2X TRUNNION CDU has not changed from the value recorded in step A.6. Use the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROL to adjust the 2X TRUNNION CDU if necessary.

B. PROCEDURE

NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, offsetting the vernier knob before each reading.

1. Cover SXT StLOS and sight through LLOS into the 5-inch autocollimator while adjusting the Rotary Table and tilt axes until the autocollimator reticle is aligned in the center of the SXT reticle.

2. Record the Rotary Table rotary axis indication.

3. Record the Rotary Table tilt axis indication.

4. Cover SXT LLOS and sight through St LOS into the 5-inch autocollimator while adjusting the Rotary Table rotary and tilt axes until the autocollimator reticle is aligned in the center of the SXT reticle.

5. Record the Rotary Table rotary axis indication.

6. Record the Rotary Table tilt axis indication.

7. Sight through SCT into the 2-1/2 inch autocollimator while adjusting the Rotary Table rotary and tilt axes until the autocollimator reticle is aligned in the center of the SCT reticle.

8. Record the Rotary Table rotary axis indication.

9. Record the Rotary Table tilt axis indication.

C. CALCULATIONS

1. Subtract the Rotary Table rotary axis indication recorded in step B.2 from the Rotary Table rotary axis indication recorded in step B.5, then algebraically add Horizontal Error from JDC 19128, step A.19. Record sum, including sign, as $\epsilon_{(ST-L)Y}$.

2. Subtract $\epsilon_{(ST-L)Y}$ from the value recorded as ϵ_{STY} in JDC 10703. Record the difference, including sign, as ϵ_{LY}.

3. Subtract the Rotary Table tilt axis indication recorded in step B.6 from the Rotary Table tilt axis indication recorded in step B.3. Record the difference including sign, as $\epsilon_{(ST-L)X}$.

4. Subtract $\epsilon_{(ST-L)X}$ from the value recorded as ϵ_{STX} in JDC 10703. Record the difference, including sign, as ϵ_{LX}.

JOB LINE-OF-SIGHT PARALLELISM CHECK | JDC 10708 REV C PAGE 3 OF 3

SUBSYSTEM OPTICAL | ASSY

5. Subtract the Rotary Table rotary axis indication recorded in step B.8 from the indication recorded in step B.5. Record the difference, including sign, as $\epsilon_{(ST-SCT)Y}$.

6. Subtract the Rotary Table tilt axis indication recorded in step B.6 from the indication recorded in step B.9. Record the difference, including sign, as $\epsilon_{(ST-SCT)X}$.

NOTE: Symbols are defined as follows (With the Optical Subsystem set to the ZERO OPTICS mode):

ϵ_{LX}; Angle from the Z_{ab} axis to the SXT LLOS about the X_{ab} axis.

ϵ_{LY}; Angle from the Z_{ab} axis to the SXT LLOS about the Y_{ab} axis.

$\epsilon_{(ST-L)X}$; Angle from the SXT LLOS to the SXT StLOS about the X_{ab} axis.

$\epsilon_{(ST-L)Y}$; Angle from the SXT LLOS to the SXT StLOS about the Y_{ab} axis.

$\epsilon_{(ST-SCT)X}$; Angle from the SCT LOS to the SXT StLOS about the X_{ab} axis.

$\epsilon_{(ST-SCT)Y}$; Angle from the SCT LOS to the SXT StLOS about the Y_{ab} axis.

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JDC NO. 10708
REV. C
INITIAL TDRR 19950

JOB LINE-OF-SIGHT PARALLELISM CHECK

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
A.6	2X TRUNNION CDU	deg	▨		▨	▨	▨
B.2	Rotary Table rotary axis	deg min sec	▨	° ′ ″	▨	▨	▨
B.3	Rotary Table tilt axis	deg min sec	▨	° ′ ″	▨	▨	▨
B.5	Rotary Table rotary axis	deg min sec	▨	° ′ ″	▨	▨	▨
B.6	Rotary Table tilt axis	deg min sec	▨	° ′ ″	▨	▨	▨
B.8	Rotary Table rotary axis	deg min sec	▨	° ′ ″	▨	▨	▨
B.9	Rotary Table tilt axis	deg min sec	▨	° ′ ″	▨	▨	▨

Released with ATP 1009502

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC 10708 REV. C PAGE 1 OF 3

INITIAL TDRR 19950 D.S. PGS 3

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SXT LOS parallelism checked by comparing alignment of SXT LLOS and SXT STLOS to autocollimator LOS. SXT-SCT centerline parallelism is also checked by determining SXT STLOS and SCT LOS parallelism.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-1-65	22222	1	-	WK JRH	TM JRH
B	10-26-65	23506	All	All	WK [illegible]	ACM [illegible]
C	1-19-67	32691	1, 2	2	EA [illegible]	-

M

M

REFERENCES ATP 1009502, paragraph 3-3.4, 3-3.6, 3-3.9 JDC's 10703 and 19128

IMPORTANT JDC 10703 shall have been performed. Insure that JDC 19128 has been performed within the last six months.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the TEST CONTROL panel are lighted:

OIA ON

OPTICS POWER ON

BLOCK I SERIES 100.

NOTE: The two autocollimator reticle lamps shall have been energized for at least 15 minutes immediately prior to use in this test.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

ZERO OPTICS

CONTROLLER DIRECT

SCT DRIVE NORMAL

SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

TRACKER

TRACKER POWER.

5. Set switches as follows:

SHAFT SLEW CONTROL to OFF

TRUNNION SLEW CONTROL to OFF

SLAVE TELESCOPE to STAR LOS.

6. Record the 2X Trunnion CDU dial indication.

7. Press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE 11 JUN 65

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC 10708 REV C PAGE 2 OF 3

SUBSYSTEM OPTICAL

ASSY

8. Use the SHAFT SLEW CONTROL switch and the COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.

9. Assure that the 2X TRUNNION CDU has not changed from the value recorded in step A.6. Use the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROL to adjust the 2X TRUNNION CDU if necessary.

B. PROCEDURE

NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, offsetting the vernier knob before each reading.

1. Cover SXT StLOS and sight through LLOS into the 5-inch autocollimator while adjusting the Rotary Table and tilt axes until the autocollimator reticle is aligned in the center of the SXT reticle.

2. Record the Rotary Table rotary axis indication.

3. Record the Rotary Table tilt axis indication.

4. Cover SXT LLOS and sight through St LOS into the 5-inch autocollimator while adjusting the Rotary Table rotary and tilt axes until the autocollimator reticle is aligned in the center of the SXT reticle.

5. Record the Rotary Table rotary axis indication.

6. Record the Rotary Table tilt axis indication.

7. Sight through SCT into the 2-1/2 inch autocollimator while adjusting the Rotary Table rotary and tilt axes until the autocollimator reticle is aligned in the center of the SCT reticle.

8. Record the Rotary Table rotary axis indication.

9. Record the Rotary Table tilt axis indication.

C. CALCULATIONS

1. Subtract the Rotary Table rotary axis indication recorded in step B.2 from the Rotary Table rotary axis indication recorded in step B.5, then algebraically add Horizontal Error from JDC 19128, step A.19. Record sum, including sign, as $\epsilon_{(ST-L)Y}$.

2. Subtract $\epsilon_{(ST-L)Y}$ from the value recorded as ϵ_{STY} in JDC 10703. Record the difference, including sign, as ϵ_{LY}.

3. Subtract the Rotary Table tilt axis indication recorded in step B.6 from the Rotary Table tilt axis indication recorded in step B.3. Record the difference including sign, as $\epsilon_{(ST-L)X}$.

4. Subtract $\epsilon_{(ST-L)X}$ from the value recorded as ϵ_{STX} in JDC 10703. Record the difference, including sign, as ϵ_{LX}.

DATE 11 JUN 65

FORM 00144
Chg. 7-23-65

JOB LINE-OF-SIGHT PARALLELISM CHECK

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SUBSYSTEM OPTICAL

ASSY

5. Subtract the Rotary Table rotary axis indication recorded in step B.8 from the indication recorded in step B.5. Record the difference, including sign, as $\epsilon_{(ST-SCT)Y}$.

6. Subtract the Rotary Table tilt axis indication recorded in step B.6 from the indication recorded in step B.9. Record the difference, including sign, as $\epsilon_{(ST-SCT)X}$.

NOTE: Symbols are defined as follows (With the Optical Subsystem set to the ZERO OPTICS mode):

ϵ_{LX}; Angle from the Z_{nb} axis to the SXT LLOS about the X_{nb} axis.

ϵ_{LY}; Angle from the Z_{nb} axis to the SXT LLOS about the Y_{nb} axis.

$\epsilon_{(ST-L)X}$; Angle from the SXT LLOS to the SXT StLOS about the X_{nb} axis.

$\epsilon_{(ST-L)Y}$; Angle from the SXT LLOS to the SXT StLOS about the Y_{nb} axis.

$\epsilon_{(ST-SCT)X}$; Angle from the SCT LOS to the SXT StLOS about the X_{nb} axis.

$\epsilon_{(ST-SCT)Y}$; Angle from the SCT LOS to the SXT StLOS about the Y_{nb} axis.

DATE 11 JUN 65

FORM 00144
Chg. 7-23-65

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NO. 10708
REV. C
INITIAL TDRR 19950

JOB LINE-OF-SIGHT PARALLELISM CHECK

ASSEMBLY UNDER TEST

TITLE

SER. NO. DWG REV.

TEST HISTORY

DATE START END SITE / LOCATION

TIME START END TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME SER. NO. CAL DATE

NAME SER. NO. CAL DATE

CONDUCTED BY NAME/AFFILIATION APPROVED BY NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
A.6	2X TRUNNION CDU	deg	▨		▨	▨	▨
B.2	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
B.3	Rotary Table tilt axis	deg min sec	▨	° ' "	▨	▨	▨
B.5	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
B.6	Rotary Table tilt axis	deg min sec	▨	° ' "	▨	▨	▨
B.8	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
B.9	Rotary Table tilt axis	deg min sec	▨	° ' "	▨	▨	▨

DATE 11 JUN 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 3

JDC
NO. 107(8
REV. C

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
C.1	Value from step B.5	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B.2	deg min sec	▨	° ' " (-) ° ' " ( )	▨	▨	▨
	Horizontal error (JDC 19128, step A.19)	deg min sec	▨	° ' " (+)	▨	▨	▨
	$\epsilon(ST-L)_Y$	$\widehat{\text{sec}}$	-10	" ( )	+10		
C.2	ϵST_Y (JDC 10703)	$\widehat{\text{sec}}$	▨	( ) ' "	▨	▨	▨
	$\epsilon(ST-L)_Y$ (step C.1)	$\widehat{\text{sec}}$	▨	(-)( ) "	▨	▨	▨
	ϵL_Y	$\widehat{\text{sec}}$	-26	( ) "	+26		
C.3	Value from step B.3	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B.6	deg min sec	▨	(-)	▨	▨	▨
	$\epsilon(ST-L)_X$	$\widehat{\text{sec}}$	-20	( )	+20		
C.4	ϵST_X (JDC 10703)	$\widehat{\text{sec}}$	▨	( ) "	▨	▨	▨
	$\epsilon(ST-L)_X$ (step C.3)	$\widehat{\text{sec}}$	▨	(-)( ) "	▨	▨	▨
	ϵL_X	$\widehat{\text{sec}}$	-26	( ) "	+26		

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 3 **OF** 3

JDC
NO. 10708
REV. C

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
C.5	Value from step B.5	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B.8	deg min sec	▨	° ' " (-)	▨	▨	▨
	$\epsilon(ST-SCT)_Y$	$\widehat{\text{min}}$	-6	( ) ' "	+6		
C.6	Value from step B.9	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B.6	deg min sec	▨	° ' " (-)	▨	▨	▨
	$\epsilon(ST-SCT)_X$	$\widehat{\text{min}}$	-3	( ) ' "	+3		

DATE 11 JUN 65

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EQUIPMENT TEST
DATA SHEET 2 **OF** 3

JDC
NO. 10708
REV. C

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
C.1	Value from step B.5	deg min sec		° ' "			
	Value from step B.2	deg min sec		° ' " (-)			
				° ' " ( )			
	Horizontal error (JDC 19128, step A.19)	deg min sec		° ' " (+)			
	$\epsilon(ST-L)_Y$	$\widehat{\text{sec}}$	-10	" ( )	+10		
C.2	ϵST_Y (JDC 10703)	$\widehat{\text{sec}}$		( ) ' "			
	$\epsilon(ST-L)_Y$ (step C.1)	$\widehat{\text{sec}}$		(-)( ) "			
	ϵL_Y	$\widehat{\text{sec}}$	-26	( ) "	+26		
C.3	Value from step B.3	deg min sec		° ' "			
	Value from step B.6	deg min sec		(-)			
	$\epsilon(ST-L)_X$	$\widehat{\text{sec}}$	-20	( )	+20		
C.4	ϵST_X (JDC 10703)	$\widehat{\text{sec}}$		( ) "			
	$\epsilon(ST-L)_X$ (step C.3)	$\widehat{\text{sec}}$		(-)( ) "			
	ϵL_X	$\widehat{\text{sec}}$	-26	( ) "	+26		

DATE 11 JUN 65

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EQUIPMENT TEST
DATA SHEET 3 **OF** 3

JDC
NO. 10708
REV. C

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
C.5	Value from step B.5	deg min sec		° ' "			
	Value from step B.8	deg min sec		° ' " (-)			
	$\epsilon(ST-SCT)_Y$	$\widehat{\text{min}}$	-6	( ) ' "	+6		
C.6	Value from step B.9	deg min sec		° ' "			
	Value from step B.6	deg min sec		° ' " (-)			
	$\epsilon(ST-SCT)_X$	$\widehat{\text{min}}$	-3	( ) ' "	+3		

DATE 11 JUN 65

Released with ATP 1009502

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC 10708 REV. D PAGE 1 OF 3

INITIAL TDRR 19950 D.S. PGS 3

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SXT LOS parallelism checked by comparing alignment of SXT LLOS and SXT STLOS to autocollimator LOS. SXT-SCT centerline parallelism is also checked by determining SXT STLOS and SCT LOS parallelism.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-1-65	22222	1	-	WK	TM
B	10-26-65	23506	All	All	WK	ACM
C	1-19-67	32691	1,2	2	EA	-
D	3-6-67	33164	-	3	EA	WS

REFERENCES ATP 1009502, paragraph 3-3.4, 3-3.6, 3-3.9 JDC's 10703 and 19128

IMPORTANT JDC 10703 shall have been performed. Insure that JDC 19128 has been performed within the last six months.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the TEST CONTROL panel are lighted:

   OIA ON

   OPTICS POWER ON

   BLOCK I SERIES 100.

   NOTE: The two autocollimator reticle lamps shall have been energized for at least 15 minutes immediately prior to use in this test.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

   ZERO OPTICS

   CONTROLLER DIRECT

   SCT DRIVE NORMAL

   SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

   TRACKER

   TRACKER POWER.

5. Set switches as follows:

   SHAFT SLEW CONTROL to OFF

   TRUNNION SLEW CONTROL to OFF

   SLAVE TELESCOPE to STAR LOS.

6. Record the 2X Trunnion CDU dial indication.

7. Press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE 11 JUN 65

JOB LINE-OF-SIGHT PARALLELISM CHECK | JDC 10708 REV D PAGE 2 OF 3

SUBSYSTEM OPTICAL | ASSY

8. Use the SHAFT SLEW CONTROL switch and the COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.

9. Assure that the 2X TRUNNION CDU has not changed from the value recorded in step A.6. Use the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROL to adjust the 2X TRUNNION CDU if necessary.

B. PROCEDURE

NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, offsetting the vernier knob before each reading.

1. Cover SXT StLOS and sight through LLOS into the 5-inch autocollimator while adjusting the Rotary Table and tilt axes until the autocollimator reticle is aligned in the center of the SXT reticle.

2. Record the Rotary Table rotary axis indication.

3. Record the Rotary Table tilt axis indication.

4. Cover SXT LLOS and sight through St LOS into the 5-inch autocollimator while adjusting the Rotary Table rotary and tilt axes until the autocollimator reticle is aligned in the center of the SXT reticle.

5. Record the Rotary Table rotary axis indication.

6. Record the Rotary Table tilt axis indication.

7. Sight through SCT into the 2-1/2 inch autocollimator while adjusting the Rotary Table rotary and tilt axes until the autocollimator reticle is aligned in the center of the SCT reticle.

8. Record the Rotary Table rotary axis indication.

9. Record the Rotary Table tilt axis indication.

C. CALCULATIONS

1. Subtract the Rotary Table rotary axis indication recorded in step B.2 from the Rotary Table rotary axis indication recorded in step B.5, then algebraically add Horizontal Error from JDC 19128, step A.19. Record sum, including sign, as $\epsilon_{(ST-L)Y}$.

2. Subtract $\epsilon_{(ST-L)Y}$ from the value recorded as ϵ_{STY} in JDC 10703. Record the difference, including sign, as ϵ_{LY}.

3. Subtract the Rotary Table tilt axis indication recorded in step B.6 from the Rotary Table tilt axis indication recorded in step B.3. Record the difference including sign, as $\epsilon_{(ST-L)X}$.

4. Subtract $\epsilon_{(ST-L)X}$ from the value recorded as ϵ_{STX} in JDC 10703. Record the difference, including sign, as ϵ_{LX}.

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SUBSYSTEM OPTICAL | ASSY

5. Subtract the Rotary Table rotary axis indication recorded in step B.8 from the indication recorded in step B.5. Record the difference, including sign, as $\epsilon_{(ST-SCT)Y}$.

6. Subtract the Rotary Table tilt axis indication recorded in step B.6 from the indication recorded in step B.9. Record the difference, including sign, as $\epsilon_{(ST-SCT)X}$.

NOTE: Symbols are defined as follows (With the Optical Subsystem set to the ZERO OPTICS mode):

ϵ_{LX}; Angle from the Z_{nb} axis to the SXT LLOS about the X_{nb} axis.

ϵ_{LY}; Angle from the Z_{nb} axis to the SXT LLOS about the Y_{nb} axis.

$\epsilon_{(ST-L)X}$; Angle from the SXT LLOS to the SXT StLOS about the X_{nb} axis.

$\epsilon_{(ST-L)Y}$; Angle from the SXT LLOS to the SXT StLOS about the Y_{nb} axis.

$\epsilon_{(ST-SCT)X}$; Angle from the SCT LOS to the SXT StLOS about the X_{nb} axis.

$\epsilon_{(ST-SCT)Y}$; Angle from the SCT LOS to the SXT StLOS about the Y_{nb} axis.

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NO. 10708
REV. D
INITIAL TDRR 19950

JOB LINE-OF-SIGHT PARALLELISM CHECK

ASSEMBLY UNDER TEST

TITLE

SER. NO. DWG REV.

TEST HISTORY

DATE START END SITE / LOCATION

TIME START END TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME SER. NO. CAL DATE

NAME SER. NO. CAL DATE

CONDUCTED BY NAME/AFFILIATION APPROVED BY NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
A.6	2X TRUNNION CDU	deg	▨		▨	▨	▨
B.2	Rotary Table rotary axis	deg min sec	▨	° ′ ″	▨	▨	▨
B.3	Rotary Table tilt axis	deg min sec	▨	° ′ ″	▨	▨	▨
B.5	Rotary Table rotary axis	deg min sec	▨	° ′ ″	▨	▨	▨
B.6	Rotary Table tilt axis	deg min sec	▨	° ′ ″	▨	▨	▨
B.8	Rotary Table rotary axis	deg min sec	▨	° ′ ″	▨	▨	▨
B.9	Rotary Table tilt axis	deg min sec	▨	° ′ ″	▨	▨	▨

DATE 11 JUN 65

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 **OF** 3

JDC
NO. 10708
REV. I

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
C.1	Value from step B.5	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B.2	deg min sec	▨	° ' " (-)	▨	▨	▨
			▨	° ' " ( )	▨	▨	▨
	Horizontal error (JDC 19128, step A.19)	deg min sec	▨	° ' " (+)	▨	▨	▨
	$\epsilon(ST-L)_Y$	$\widehat{sec}$	-10	" ( )	+10		
C.2	ϵST_Y (JDC 10703)	$\widehat{sec}$	▨	( ) ' "	▨	▨	▨
	$\epsilon(ST-L)_Y$ (step C.1)	$\widehat{sec}$	▨	(-)( ) "	▨	▨	▨
	ϵL_Y	$\widehat{sec}$	-26	( ) "	+26		
C.3	Value from step B.3	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B.6	deg min sec	▨	(-)	▨	▨	▨
	$\epsilon(ST-L)_X$	$\widehat{sec}$	-20	( )	+20		
C.4	ϵST_X (JDC 10703)	$\widehat{sec}$	▨	( ) "	▨	▨	▨
	$\epsilon(ST-L)_X$ (step C.3)	$\widehat{sec}$	▨	(-)( ) "	▨	▨	▨
	ϵL_X	$\widehat{sec}$	-26	( ) "	+26		

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EQUIPMENT TEST
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JDC
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JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
C.5	Value from step B.5	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B.8	deg min sec	▨	° ' " (-)	▨	▨	▨
	$\epsilon(ST-SCT)_Y$	$\widehat{min}$	-14	( ) ' "	+14		
C.6	Value from step B.9	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B.6	deg min sec	▨	° ' " (-)	▨	▨	▨
	$\epsilon(ST-SCT)_X$	$\widehat{min}$	-3	( ) ' "	+3		

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Released with ATP 1009502

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JOB LINE-OF-SIGHT PARALLELISM CHECK

INITIAL TDRR 19950 D.S. PGS 3

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SXT LOS parallelism checked by comparing alignment of SXT LLOS and SXT STLOS to autocollimator LOS. SXT-SCT centerline parallelism is also checked by determining SXT STLOS and SCT LOS parallelism.

Rev. Let.	Date	TDRR NO.	PAGES REVISED JDC	PAGES REVISED D.S.	APPROVAL MIT	APPROVAL NASA

REFERENCES ATP 1009502, paragraph 3-3.4, 3-3.6, 3-3.9 JDC's 10703, 10706

IMPORTANT JDC's 10703 and 10706 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.
2. Assure that the following pushbuttons on the TEST CONTROL panel are lighted:

    OIA ON-ISS POWER DISABLED
    OPTICS POWER ON
    BLOCK I SERIES 100.

    NOTE: the two autocollimator reticle lamps shall have been energized for at least 15 minutes immediately prior to use in this test.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

    ZERO OPTICS
    CONTROLLER DIRECT
    SCT DRIVE NORMAL
    SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

    TRACKER
    TRACKER POWER.

5. Set switches as follows:

    SHAFT SLEW CONTROL to OFF
    TRUNNION SLEW CONTROL to OFF
    SLAVE TELESCOPE to STAR LOS.

6. Record the 2X Trunnion CDU dial indication.
7. Press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

VERIFICATION WITH SIDL REQUIRED BEFORE USE

DATE ______

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC 10708 REV - PAGE 2 OF 3

SUBSYSTEM OPTICAL

ASSY

8. Use the SHAFT SLEW CONTROL switch and the COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.
9. Assure that the 2X TRUNNION CDU has not changed from the value recorded in step A.6. Use the TRUNNION SLEW CONTROL switch and the COARSE and FINE GAIN CONTROL to adjust the 2X TRUNNION CDU if necessary.

B. PROCEDURE

NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, offsetting the vernier knob before each reading.

1. Cover SXT LLOS and sight through St LOS into the 5-inch autocollimator while adjusting the Rotary Table rotary and tilt axes until the autocollimator reticle is aligned in the center of the SXT reticle.
2. Record the Rotary Table rotary axis indication.
3. Record the Rotary Table tilt axis indication.
4. Sight through SCT into the 2-1/2-inch autocollimator while adjusting the Rotary Table rotary and tilt axes until the autocollimator reticle is aligned in the center of the SCT reticle.
5. Record the Rotary Table rotary axis indication.
6. Record the Rotary Table tilt axis indication.

C. CALCULATIONS

1. Subtract the Rotary Table ZRP (from JDC 10706) from the Rotary Table rotary axis indication recorded in step B.2. Record the difference, including sign, as $\epsilon_{(ST-L)Y}$.
2. Subtract $\epsilon_{(ST-L)Y}$ from the value recorded as ϵ_{STY} in JDC 10703. Record the difference, including sign, as ϵ_{LY}.
3. Subtract the Rotary Table tilt axis indication recorded in step B.3 from the Rotary Table tilt axis ZRP of 0° 00' 00" (or 360° 00' 00", whichever yields a smaller value). Record the difference including sign, as $\epsilon_{(ST-L)X}$.
4. Subtract $\epsilon_{(ST-L)X}$ from the value recorded as ϵ_{STX} in JDC 10703. Record the difference, including sign, as ϵ_{LX}.
5. Subtract the Rotary Table rotary axis indication recorded in step B.5 from the indication recorded in step B.2. Record the difference, including sign, as $\epsilon_{(ST-SCT)Y}$.

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JOB LINE-OF-SIGHT PARALLELISM CHECK

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SUBSYSTEM OPTICAL

ASSY

6. Subtract the Rotary Table tilt axis indication recorded in step B.3 from the indication recorded in step B.6. Record the difference, including sign, as $\epsilon_{(ST-SCT)X}$.

    NOTE: Symbols are defined as follows (With the Optical Subsystem set to the ZERO OPTICS mode):

    ϵ_{LX}; Angle from the Z_{nb} axis to the SXT LLOS about the X_{nb} axis.

    ϵ_{LY}; Angle from the Z_{nb} axis to the SXT LLOS about the Y_{nb} axis.

    $\epsilon_{(ST-L)X}$; Angle from the SXT LLOS to the SXT StLOS about the X_{nb} axis.

    $\epsilon_{(ST-L)Y}$; Angle from the SXT LLOS to the SXT StLOS about the Y_{nb} axis.

    $\epsilon_{(ST-SCT)X}$; Angle from the SCT LOS to the SXT StLOS about the X_{nb} axis.

    $\epsilon_{(ST-SCT)Y}$; Angle from the SCT LOS to the SXT StLOS about the Y_{nb} axis.

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JOB LINE-OF-SIGHT PARALLELISM CHECK

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE

NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION

APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
A.6	2X TRUNNION CDU	deg	▨		▨	▨	▨
B.2	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
B.3	Rotary Table tilt axis	deg min sec	▨	° ' "	▨	▨	▨
B.5	Rotary Table rotary axis	deg min sec	▨	° ' "	▨	▨	▨
B.6	Rotary Table tilt axis	deg min sec	▨	° ' "	▨	▨	▨

DATE ______

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 2 OF 3

JDC
NO. 10708
REV. –

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
C.1	Value from step B.2	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table ZRP (JDC 10706)	deg min sec	▨	(-) ° ' "	▨	▨	▨
	$\epsilon(ST-L)_Y$	$\widehat{sec}$	-10	( ) "	+10		
C.2	ϵST_Y (JDC 10703)	$\widehat{sec}$	▨	( ) ' "	▨	▨	▨
	$\epsilon(ST-L)_Y$ (step C.1)	$\widehat{sec}$	▨	(-)( ) "	▨	▨	▨
	ϵL_Y	$\widehat{sec}$	-26	( ) "	+26		
C.3	Rotary Table tilt axis ZRP	deg min sec	▨	0° 00' 00" or 360° 00' 00"	▨	▨	▨
	Value from step B.3	deg min sec	▨	(-)	▨	▨	▨
	$\epsilon(ST-L)_X$	$\widehat{sec}$	-20	( )	+20		
C.4	ϵST_X (JDC 10703)	$\widehat{sec}$	▨	( ) "	▨	▨	▨
	$\epsilon(ST-L)_X$ (step C.3)	$\widehat{sec}$	▨	(-)( ) "	▨	▨	▨
	ϵL_X	$\widehat{sec}$	-26	( ) "	+26		

DATE ________

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EQUIPMENT TEST
DATA SHEET 3 OF 3

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REV. –

JOB LINE-OF-SIGHT PARALLELISM CHECK

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
C.5	Value from step B.2	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B.5	deg min sec	▨	(-) ° ' "	▨	▨	▨
	$\epsilon(ST-SCT)_Y$	$\widehat{min}$	-6	( ) ' "	+6		
C.6	Value from step B.6	deg min sec	▨	° ' "	▨	▨	▨
	Value from step B.3	deg min sec	▨	(-) ° ' "	▨	▨	▨
	$\epsilon(ST-SCT)_X$	$\widehat{min}$	-3	( ) ' "	+3		

DATE ________

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

INITIAL TDRR 19950 D.S. PGS 21

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SXT trunnion accuracy is checked by comparing SCT panel trunnion angle counter, 2X TRUNNION CDU readout, and trunnion encoder output with Rotary Table Angles. Trunnion limits are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-16-65	22523	1, 3	All	MGM	TM

REFERENCES ATP 1009502, Paragraphs 3-3.4, 3-3.10, and JDC's 10734 and 10706

IMPORTANT JDC 10706 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

NOTE: Assure that the Counter, Phase Angle Voltmeter (PAVM), and 5-inch autocollimator reticle lamp have been energized a minimum of 15 minutes immediately prior to use in this test.

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.
2. Assure that the following pushbuttons on the Test Control panel are lighted:
   OIA ON
   OPTICS POWER ON
   BLOCK I SERIES 100.
3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:
   ZERO OPTICS
   CONTROLLER DIRECT
   SCT DRIVE NORMAL
   SXT DRIVE NORMAL.
4. Assure that the following pushbuttons are not lighted:
   TRACKER
   TRACKER POWER.
5. Set switches as follows:
   SHAFT SLEW CONTROL to OFF
   TRUNNION SLEW CONTROL to OFF
   SLAVE TELESCOPE to STAR LOS.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ________

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6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.
7. Adjust the BRIGHTNESS control (inside the side access panel of the Remote Optics Controller) until the SXT reticle illumination is at a comfortable level.
8. Connect the 2X TRUNNION CDU encoder output to the Counter by setting the COUNTER INPUT "A" OR "AB" selector on Primary Signal Selector panel to 16.
9. Set selectors on Counter to perform forward-reverse counting function as follows:
   DISPLAY TIME (N_s) to 10^5
   DISPLAY RESET to ZERO
   CLOCK FREQUENCY DIVIDER to 1
   CLOCK SELECTOR to INT
   FUNCTION to COUNT
   INPUT SELECTOR to A-B
   SENSE SELECTOR to FWD.
10. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on Remote Optics Controller to drive 2X TRUNNION CDU while adjusting ATTEN, SLOPE, and TRIGGER switches and controls on channels A and B of the Counter.
11. Press the MANUAL/ZERO OPTICS pushbutton to light the ZERO OPTICS indicator.
12. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.
13. Connect 2X TRUNNION CDU 16X resolver error output to PAVM by setting Primary Signal Selector to 206.
14. Set the FREQUENCY switch on the PAVM to 800~ NO. 1.
15. Use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.
16. Press the RESET pushbutton on Counter.

NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, offsetting the vernier knob before each reading.

17. Set the tilt axis of the Rotary Table to 0° 00' 00" (±1").

B. PROCEDURE

1. Add each of the incremental angles in the following table to the ZRP established

DATE ________

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in JDC 10706. If the sum is greater than 360°, subtract 360°. Subtract the respective table rotary axis calibration errors obtained from the calibration chart. Position the Rotary Table rotary axis to within ±1 arc second of each of the calculated angles. At each Rotary Table setting, perform the following steps:

a. Sight through the SXT eyepiece and use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller to position the 5-inch autocollimator reticle at the center of the SXT reticle. Use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to adjust the SXT shaft angle if necessary.
b. Record 2X TRUNNION CDU, Counter, and SCT panel trunnion angle counter indications.
c. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of 2X TRUNNION CDU 16X resolver error signal.

INCREMENTAL ANGLES - STEP B. 1

(1)	0°	00'	00"
(2)	4°	00'	00"
(3)	11°	00'	00"
(4)	16°	00'	00"
(5)	22°	00'	00"

INCREMENTAL ANGLES - STEP B. 1 (cont)

(6)	30°	00'	00"
(7)	36°	00'	00"
(8)	40°	00'	00"
(9)	45°	00'	00"
(10)	50°	00'	00"
(11)	54°	00'	00"
(12)	57°	00'	00"
(13)	0°	00'	00"

2. Add each of the incremental angles in the following table to the ZRP established in JDC 10706. Subtract the respective table rotary axis calibration error obtained from the calibration chart. Rotate the Rotary Table to within ±1 arc second of each of the calculated angles. At each Rotary Table setting, perform the following steps:
   a. Repeat step B. 1. a.
   b. Record 2X TRUNNION CDU and Counter indications.
   c. Use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the 2X TRUNNION CDU indication to approximately 80.000.
   d. Repeat step B. 1. a.
   e. Record 2X TRUNNION CDU and Counter indications.
   f. Repeat step B. 2. c.
   g. Repeat step B. 1. a.
   h. Record 2X TRUNNION CDU and Counter indications.

DATE ________

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i. Calculate and record the difference between the maximum and minimum 2X TRUNNION CDU indications recorded in steps B. 2. b, B. 2. e and B. 2. h. For the 45° 00' 00" increment, calculate and record the difference between the maximum and minimum 2X TRUNNION CDU indications recorded in steps B. 1. b, B. 2. b, B. 2. e and B. 2. h.

INCREMENTAL ANGLES - STEP B. 2

(1)	44°	58'	30"
(2)	44°	59'	00"
(3)	44°	59'	30"
(4)	45°	00'	00"
(5)	45°	00'	30"
(6)	45°	01'	00"
(7)	45°	01'	30"

3. Install Portable Light Assembly to SXT eyepiece and energize the Illuminator lamp. Adjust the light intensity to a comfortable level.
4. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive 2X TRUNNION CDU to approximately 175°.
5. Set the COARSE GAIN CONTROL switch to LO.

NOTE: Alignment of the reflected reticle image in step B. 6 will be obtained at the SXT trunnion self-autocollimation angle at a nominal 2X TRUNNION CDU indication of 180.000.

6. Sight through the SXT eyepiece and use the TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL to align the reticle image to the reflected reticle image. Record the 2X TRUNNION CDU indication.
7. Using TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL, drive SXT trunnion in the positive direction until the 2X TRUNNION CDU dials stop moving. Record the 2X TRUNNION CDU indication.
8. Press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the ZERO OPTICS indicator.
9. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.
10. Using TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL, drive SXT trunnion in the negative direction until the 2X TRUNNION CDU dials stop moving. Record the 2X TRUNNION CDU indication
11. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

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EQUIPMENT TEST
DATA SHEET 1 OF 21

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

ASSEMBLY UNDER TEST

TITLE ______

SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION

TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE ______

NAME ______ SER. NO. ______ CAL DATE ______

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(1)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+0° 00' 00"	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
	2X TRUNNION CDU	deg	359.984		0.016		
	Encoder Count	pulses	-3		+3		
	Trunnion Angle Counter	deg	359.66		0.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv	▨		▨	▨	▨
	2X TRUNNION CDU 16X Quadrature Voltage	mv	▨		▨	▨	▨

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 21

JDC
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REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(2)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	(+)4° 00' 00"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ϵ_{TC} (335°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
	2X TRUNNION CDU	deg	7.984		8.016		
	Encoder Count	pulses	1453		1459		
	Trunnion Angle Counter	deg	3.66		4.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv	▨		▨	▨	▨
	2X TRUNNION CDU 16X Quadrature Voltage	mv	▨		▨	▨	▨

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 3 OF 21

JDC
NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(3)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+11° 00' 00"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ϵ_{TC} (340°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
	2X TRUNNION CDU	deg	21.984		22.016		
	Encoder Count	pulses	4002		4008		
	Trunnion Angle Counter	deg	10.66		11.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv	▨		▨	▨	▨
	2X TRUNNION CDU 16X Quadrature Voltage	mv	▨		▨	▨	▨

DATE ______

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 21

JDC
NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(4)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+16° 00' 00"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ϵ_{TC} (345°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
	2X TRUNNION CDU	deg	31.984		32.016		
	Encoder Count	pulses	5823		5829		
	Trunnion Angle Counter	deg	15.66		16.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv	▨		▨	▨	▨
	2X TRUNNION CDU 16X Quadrature Voltage	mv	▨		▨	▨	▨

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 OF 21

JDC
NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(5)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+22° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (350°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	43.984		44.016		
	Encoder Count	pulses	8007		8013		
	Trunnion Angle Counter	deg	21.66		22.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 6 OF 21

JDC
NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(6)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		-30° 00' 00"			
	ZRP - Increment	deg min sec		° ' "			
	*TC (0°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	59.984		60.016		
	Encoder Count	pulses	10920		10926		
	Trunnion Angle Counter	deg	29.66		30.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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EQUIPMENT TEST
DATA SHEET 7 OF 21

JDC
NO. 0709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(7)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+36° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (5°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	71.984		72.016		
	Encoder Count	pulses	13105		13111		
	Trunnion Angle Counter	deg	35.66		36.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 8 OF 21

JDC
NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(8)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		-40° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (10°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	79.984		80.016		
	Encoder Count	pulses	14561		14567		
	Trunnion Angle Counter	deg	39.66		40.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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EQUIPMENT TEST
DATA SHEET 9 OF 21

JDC
NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(9)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	°TC (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	89.984		90.016		
	Encoder Count	pulses	16381		16387		
	Trunnion Angle Counter	deg	44.66		45.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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EQUIPMENT TEST
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JDC
NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(10)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+50° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	°TC (20°)	arc min		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	99.984		100.016		
	Encoder Count	pulses	18201		18207		
	Trunnion Angle Counter	deg	49.66		50.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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EQUIPMENT TEST
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JDC
NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(11)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+54° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	°TC (23°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	107.984		108.016		
	Encoder Count	pulses	19658		19664		
	Trunnion Angle Counter	deg	53.66		54.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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EQUIPMENT TEST
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NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(12)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+57° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	°TC (27°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION.CDU	deg	113,984		114,016		
	Encoder Count	pulses	20750		20756		
	Trunnion Angle Counter	deg	56.66		57.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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EQUIPMENT TEST
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(13)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		(+)0° 00' 00"			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	359.984		0.016		
	Encoder Count	pulses	-3		+3		
	Trunnion Angle Counter	deg	359.66		0.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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APOLLO G & N
EQUIPMENT TEST
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JDC NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 2(1)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+44° 58' 30"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.934		89.966		
e.	2X TRUNNION CDU	deg	89.934		89.966		
h.	2X TRUNNION CDU	deg	89.934		89.966		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16372		16378		
e.	Encoder Count	pulses	16372		16378		
h.	Encoder Count	pulses	16372		16378		

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EQUIPMENT TEST
DATA SHEET 15 **OF** 21

JDC NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 2(2)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+44° 59' 00"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.951		89.983		
e.	2X TRUNNION CDU	deg	89.951		89.983		
h.	2X TRUNNION CDU	deg	89.951		89.983		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16375		16381		
e.	Encoder Count	pulses	16375		16381		
h.	Encoder Count	pulses	16375		16381		

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EQUIPMENT TEST
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JDC NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 2(3)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+44° 59' 30"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.967		89.999		
e.	2X TRUNNION CDU	deg	89.967		89.999		
h.	2X TRUNNION CDU	deg	89.967		89.999		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16378		16384		
e.	Encoder Count	pulses	16378		16384		
h.	Encoder Count	pulses	16378		16384		

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JDC
NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(4)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.984		90.016		
e.	2X TRUNNION CDU	deg	89.984		90.016		
h.	2X TRUNNION CDU	deg	89.984		90.016		
i.	2X TRUNNION CDU from step B.1.b data sheet 10.	deg					
i.	(Max - Min) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16381		16387		
e.	Encoder Count	pulses	16381		16387		
h.	Encoder Count	pulses	16381		16387		

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(5)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 00' 30"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	90.001		90.033		
e.	2X TRUNNION CDU	deg	90.001		90.033		
h.	2X TRUNNION CDU	deg	90.001		90.033		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16384		16390		
e.	Encoder Count	pulses	16384		16390		
h.	Encoder Count	pulses	16384		16390		

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DATA SHEET 19 **OF** 21

JDC
NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(6)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 01' 00"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	90.017		90.049		
e.	2X TRUNNION CDU	deg	90.017		90.049		
h.	2X TRUNNION CDU	deg	90.017		90.049		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16387		16393		
e.	Encoder Count	pulses	16387		16393		
h.	Encoder Count	pulses	16387		16393		

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EQUIPMENT TEST
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JDC
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REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(7)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 01' 30"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	90.034		90.066		
e.	2X TRUNNION CDU	deg	90.034		90.066		
h.	2X TRUNNION CDU	deg	90.034		90.066		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16390		16396		
e.	Encoder Count	pulses	16390		16396		
h.	Encoder Count	pulses	16390		16396		

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EQUIPMENT TEST
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JDC
NO. 10709
REV. A

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6	2X TRUNNION CDU	deg	▨		▨	▨	▨
B.7	2X TRUNNION CDU	deg	180.000		200.000		
B.10	2X TRUNNION CDU	deg	340.000		000.000		

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Released with ATP 1009502

JOB SXT TRUNNION ACCURACY AND LIMITS TEST | **JDC** 10709 **REV.** B **PAGE** 1 **OF** 4 | **INITIAL TDRR** 19950 **D.S. PGS** 21

SUBSYSTEM OPTICAL | **ASSY.**

DESCRIPTION SXT trunnion accuracy is checked by comparing SCT panel trunnion angle counter, 2X TRUNNION CDU readout, and trunnion encoder output with Rotary Table Angles. Trunnion limits are also checked.

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			JDC	D.S.	MIT	NASA
A	9-16-65	22523	1, 3	All	MGM	TM
B	12-14-65	24742	-	17	WK	-

REFERENCES ATP 1009502, Paragraphs 3-3.4, 3-3.10, and JDC's 10734 and 10706

IMPORTANT JDC 10706 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

NOTE: Assure that the Counter, Phase Angle Voltmeter (PAVM), and 5-inch autocollimator reticle lamp have been energized a minimum of 15 minutes immediately prior to use in this test.

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

   OIA ON

   OPTICS POWER ON

   BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

   ZERO OPTICS

   CONTROLLER DIRECT

   SCT DRIVE NORMAL

   SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

   TRACKER

   TRACKER POWER.

5. Set switches as follows:

   SHAFT SLEW CONTROL to OFF

   TRUNNION SLEW CONTROL to OFF

   SLAVE TELESCOPE to STAR LOS.

VERIFICATION WITH SIDL REQUIRED BEFORE USE **DATE** 11 JUN 65

JOB SXT TRUNNION ACCURACY AND LIMITS TEST | **JDC** 10709 **REV** B **PAGE** 2 **OF** 4

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6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

7. Adjust the BRIGHTNESS control (inside the side access panel of the Remote Optics Controller) until the SXT reticle illumination is at a comfortable level.

8. Connect the 2X TRUNNION CDU encoder output to the Counter by setting the COUNTER INPUT "A" OR "AB" selector on Primary Signal Selector panel to 16.

9. Set selectors on Counter to perform forward-reverse counting function as follows:

   DISPLAY TIME (N_s) to 10^5

   DISPLAY RESET to ZERO

   CLOCK FREQUENCY DIVIDER to 1

   CLOCK SELECTOR to INT

   FUNCTION to COUNT

   INPUT SELECTOR to A-B

   SENSE SELECTOR to FWD.

10. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on Remote Optics Controller to drive 2X TRUNNION CDU while adjusting ATTEN, SLOPE, and TRIGGER switches and controls on channels A and B of the Counter.

11. Press the MANUAL/ZERO OPTICS pushbutton to light the ZERO OPTICS indicator.

12. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

13. Connect 2X TRUNNION CDU 16X resolver error output to PAVM by setting Primary Signal Selector to 206.

14. Set the FREQUENCY switch on the PAVM to 800~ NO. 1.

15. Use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.

16. Press the RESET pushbutton on Counter.

   NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, off-setting the vernier knob before each reading.

17. Set the tilt axis of the Rotary Table to 0° 00' 00" (±1").

B. PROCEDURE

1. Add each of the incremental angles in the following table to the ZRP established

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST | **JDC** 10709 **REV** B **PAGE** 3 **OF** 4

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in JDC 10706. If the sum is greater than 360°, subtract 360°. Subtract the respective table rotary axis calibration errors obtained from the calibration chart. Position the Rotary Table rotary axis to within ±1 arc second of each of the calculated angles. At each Rotary Table setting, perform the following steps:

a. Sight through the SXT eyepiece and use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller to position the 5-inch autocollimator reticle at the center of the SXT reticle. Use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to adjust the SXT shaft angle if necessary.

b. Record 2X TRUNNION CDU, Counter, and SCT panel trunnion angle counter indications.

c. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of 2X TRUNNION CDU 16X resolver error signal.

INCREMENTAL ANGLES - STEP B. 1

(1)	0°	00'	00"
(2)	4°	00'	00"
(3)	11°	00'	00"
(4)	16°	00'	00"
(5)	22°	00'	00"

INCREMENTAL ANGLES - STEP B. 1 (cont)

(6)	30°	00'	00"
(7)	36°	00'	00"
(8)	40°	00'	00"
(9)	45°	00'	00"
(10)	50°	00'	00"
(11)	54°	00'	00"
(12)	57°	00'	00"
(13)	0°	00'	00"

2. Add each of the incremental angles in the following table to the ZRP established in JDC 10706. Subtract the respective table rotary axis calibration error obtained from the calibration chart. Rotate the Rotary Table to within ±1 arc second of each of the calculated angles. At each Rotary Table setting, perform the following steps:

a. Repeat step B. 1. a.

b. Record 2X TRUNNION CDU and Counter indications.

c. Use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the 2X TRUNNION CDU indication to approximately 80.000.

d. Repeat step B. 1. a.

e. Record 2X TRUNNION CDU and Counter indications.

f. Repeat step B. 2. c.

g. Repeat step B. 1. a.

h. Record 2X TRUNNION CDU and Counter indications.

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST | **JDC** 10709 **REV** B **PAGE** 4 **OF** 4

SUBSYSTEM OPTICAL | **ASSY**

1. Calculate and record the difference between the maximum and minimum 2X TRUNNION CDU indications recorded in steps B. 2. b, B. 2. e and B. 2. h. For the 45° 00' 00" increment, calculate and record the difference between the maximum and minimum 2X TRUNNION CDU indications recorded in steps B. 1. b, B. 2. b, B. 2. e and B. 2. h.

INCREMENTAL ANGLES - STEP B. 2

(1)	44°	58'	30"
(2)	44°	59'	00"
(3)	44°	59'	30"
(4)	45°	00'	00"
(5)	45°	00'	30"
(6)	45°	01'	00"
(7)	45°	01'	30"

3. Install Portable Light Assembly to SXT eyepiece and energize the illuminator lamp. Adjust the light intensity to a comfortable level.

4. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive 2X TRUNNION CDU to approximately 175°.

5. Set the COARSE GAIN CONTROL switch to LO.

   NOTE: Alignment of the reflected reticle image in step B. 6 will be obtained at the SXT trunnion self-autocollimation angle at a nominal 2X TRUNNION CDU indication of 180.000.

6. Sight through the SXT eyepiece and use the TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL to align the reticle image to the reflected reticle image. Record the 2X TRUNNION CDU indication.

7. Using TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL, drive SXT trunnion in the positive direction until the 2X TRUNNION CDU dials stop moving. Record the 2X TRUNNION CDU indication.

8. Press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the ZERO OPTICS indicator.

9. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

10. Using TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL, drive SXT trunnion in the negative direction until the 2X TRUNNION CDU dials stop moving. Record the 2X TRUNNION CDU indication

11. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

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Released with ATP 1009502

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

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INITIAL TDRR 19950 **D.S. PGS** 21

SUBSYSTEM OPTICAL **ASSY.**

DESCRIPTION SXT trunnion accuracy is checked by comparing SCT panel trunnion angle counter, 2X TRUNNION CDU readout, and trunnion encoder output with Rotary Table Angles. Trunnion limits are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-16-65	22523	1, 3	All	MGM	TM
Ⓜ B	12-14-65	24742	-	17	WK	-

REFERENCES ATP 1009502, Paragraphs 3-3.4, 3-3.10, and JDC's 10734 and 10706

IMPORTANT JDC 10706 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

NOTE: Assure that the Counter, Phase Angle Voltmeter (PAVM), and 5-inch autocollimator reticle lamp have been energized a minimum of 15 minutes immediately prior to use in this test.

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

OIA ON
OPTICS POWER ON
BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

ZERO OPTICS
CONTROLLER DIRECT
SCT DRIVE NORMAL
SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

TRACKER
TRACKER POWER.

5. Set switches as follows:

SHAFT SLEW CONTROL to OFF
TRUNNION SLEW CONTROL to OFF
SLAVE TELESCOPE to STAR LOS.

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST **JDC** 10709 **REV** B **PAGE** 2 **OF** 4

SUBSYSTEM OPTICAL **ASSY**

6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

7. Adjust the BRIGHTNESS control (inside the side access panel of the Remote Optics Controller) until the SXT reticle illumination is at a comfortable level.

8. Connect the 2X TRUNNION CDU encoder output to the Counter by setting the COUNTER INPUT "A" OR "AB" selector on Primary Signal Selector panel to 16.

9. Set selectors on Counter to perform forward-reverse counting function as follows:

DISPLAY TIME (N_8) to 10^5
DISPLAY RESET to ZERO
CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to COUNT
INPUT SELECTOR to A-B
SENSE SELECTOR to FWD.

10. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on Remote Optics Controller to drive 2X TRUNNION CDU while adjusting ATTEN, SLOPE, and TRIGGER switches and controls on channels A and B of the Counter.

11. Press the MANUAL/ZERO OPTICS pushbutton to light the ZERO OPTICS indicator.

12. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

13. Connect 2X TRUNNION CDU 16X resolver error output to PAVM by setting Primary Signal Selector to 206.

14. Set the FREQUENCY switch on the PAVM to 800~ NO. 1.

15. Use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.

16. Press the RESET pushbutton on Counter.

NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, offsetting the vernier knob before each reading.

17. Set the tilt axis of the Rotary Table to 0° 00' 00" (±1").

B. PROCEDURE

1. Add each of the incremental angles in the following table to the ZRP established in JDC 10706. If the sum is greater than 360°, subtract 360°. Subtract the respective table rotary axis calibration errors obtained from the calibration chart. Position the Rotary Table rotary axis to within ±1 arc second of each of the calculated angles. At each Rotary Table setting, perform the following steps:

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST **JDC** 10709 **REV** B **PAGE** 3 **OF** 4

SUBSYSTEM OPTICAL **ASSY**

a. Sight through the SXT eyepiece and use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller to position the 5-inch autocollimator reticle at the center of the SXT reticle. Use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to adjust the SXT shaft angle if necessary.

b. Record 2X TRUNNION CDU, Counter, and SCT panel trunnion angle counter indications.

c. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of 2X TRUNNION CDU 16X resolver error signal.

INCREMENTAL ANGLES - STEP B.1

(1)	0°	00'	00"
(2)	4°	00'	00"
(3)	11°	00'	00"
(4)	16°	00'	00"
(5)	22°	00'	00"

INCREMENTAL ANGLES - STEP B.1 (cont)

(6)	30°	00'	00"
(7)	36°	00'	00"
(8)	40°	00'	00"
(9)	45°	00'	00"
(10)	50°	00'	00"
(11)	54°	00'	00"
(12)	57°	00'	00"
(13)	0°	00'	00"

2. Add each of the incremental angles in the following table to the ZRP established in JDC 10706. Subtract the respective table rotary axis calibration error obtained from the calibration chart. Rotate the Rotary Table to within ±1 arc second of each of the calculated angles. At each Rotary Table setting, perform the following steps:

a. Repeat step B.1.a.

b. Record 2X TRUNNION CDU and Counter indications.

c. Use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the 2X TRUNNION CDU indication to approximately ±0.000.

d. Repeat step B.1.a.

e. Record 2X TRUNNION CDU and Counter indications.

f. Repeat step B.2.c.

g. Repeat step B.1.a.

h. Record 2X TRUNNION CDU and Counter indications.

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST **JDC** 10709 **REV** B **PAGE** 4 **OF** 4

SUBSYSTEM OPTICAL **ASSY**

1. Calculate and record the difference between the maximum and minimum 2X TRUNNION CDU indications recorded in steps B.2.b, B.2.e and B.2.h. For the 45° 00' 00" increment, calculate and record the difference between the maximum and minimum 2X TRUNNION CDU indications recorded in steps B.1.b, B.2.b, B.2.e and B.2.h.

INCREMENTAL ANGLES - STEP B.2

(1)	44°	58'	30"
(2)	44°	59'	00"
(3)	44°	59'	30"
(4)	45°	00'	00"
(5)	45°	00'	30"
(6)	45°	01'	00"
(7)	45°	01'	30"

3. Install Portable Light Assembly to SXT eyepiece and energize the Illuminator lamp. Adjust the light intensity to a comfortable level.

4. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive 2X TRUNNION CDU to approximately 175°.

5. Set the COARSE GAIN CONTROL switch to LO.

NOTE: Alignment of the reflected reticle image in step B.6 will be obtained at the SXT trunnion self-autocollimation angle at a nominal 2X TRUNNION CDU indication of 180.000.

6. Sight through the SXT eyepiece and use the TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL to align the reticle image to the reflected reticle image. Record the 2X TRUNNION CDU indication.

7. Using TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL, drive SXT trunnion in the positive direction until the 2X TRUNNION CDU dials stop moving. Record the 2X TRUNNION CDU indication.

8. Press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the ZERO OPTICS indicator.

9. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

10. Using TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL, drive SXT trunnion in the negative direction until the 2X TRUNNION CDU dials stop moving. Record the 2X TRUNNION CDU indication.

11. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

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EQUIPMENT TEST
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INITIAL TDRR 19950

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

ASSEMBLY UNDER TEST

TITLE ______
SER. NO. ______ DWG ______ REV. ______

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ______ SER. NO. ______ CAL DATE
NAME ______ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(1)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+0° 00' 00"			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	359.984		0.016		
	Encoder Count	pulses	-3		+3		
	Trunnion Angle Counter	deg	359.66		0.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(2)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		(+)4° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	^{e}TC (335°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	7.984		8.016		
	Encoder Count	pulses	1453		1459		
	Trunnion Angle Counter	deg	3.66		4.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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DATA SHEET 3 OF 21

JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(3)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+11° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	^{e}TC (340°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	21.984		22.016		
	Encoder Count	pulses	4002		4008		
	Trunnion Angle Counter	deg	10.66		11.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(4)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+16° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	^{e}TC (345°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	31.984		32.016		
	Encoder Count	pulses	5823		5829		
	Trunnion Angle Counter	deg	15.66		16.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. B
INITIAL TDRR 19050

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

ASSEMBLY UNDER TEST

TITLE ____________
SER. NO. ______ DWG ______ REV. ____

TEST HISTORY

DATE ______ START ______ END ______ SITE / LOCATION
TIME ______ START ______ END ______ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____________ SER. NO. ______ CAL DATE
NAME ____________ SER. NO. ______ CAL DATE

CONDUCTED BY ______ NAME/AFFILIATION   APPROVED BY ______ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(1)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+0° 00' 00"			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	359.984		0.016		
	Encoder Count	pulses	-3		+3		
	Trunnion Angle Counter	deg	359.66		0.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(2)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		(+)4° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	ϵTC (335°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	7.984		8.016		
	Encoder Count	pulses	1453		1459		
	Trunnion Angle Counter	deg	3.66		4.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(3)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+11° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	ϵTC (340°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	21.984		22.016		
	Encoder Count	pulses	4002		4008		
	Trunnion Angle Counter	deg	10.66		11.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(4)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+16° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	ϵTC (345°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	31.984		32.016		
	Encoder Count	pulses	5823		5829		
	Trunnion Angle Counter	deg	15.66		16.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(5)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+22° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	•TC (350°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	43.984		44.016		
	Encoder Count	pulses	8007		8013		
	Trunnion Angle Counter	deg	21.66		22.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(6)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+30° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	•TC (0°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	59.984		60.016		
	Encoder Count	pulses	10920		10926		
	Trunnion Angle Counter	deg	29.66		30.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(7)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+36° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	•TC (5°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	71.984		72.016		
	Encoder Count	pulses	13105		13111		
	Trunnion Angle Counter	deg	35.66		36.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(8)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+40° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	•TC (10°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	79.984		80.016		
	Encoder Count	pulses	14561		14567		
	Trunnion Angle Counter	deg	39.66		40.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(5)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+22° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (350°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	43.984		44.016		
	Encoder Count	pulses	8007		8013		
	Trunnion Angle Counter	deg	21.66		22.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(6)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+30° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (0°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	59.984		60.016		
	Encoder Count	pulses	10920		10926		
	Trunnion Angle Counter	deg	29.66		30.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(7)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+36° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (5°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	71.984		72.016		
	Encoder Count	pulses	13105		13111		
	Trunnion Angle Counter	deg	35.66		36.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(8)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+40° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (10°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	79.984		80.016		
	Encoder Count	pulses	14561		14567		
	Trunnion Angle Counter	deg	39.66		40.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(9)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	89.984		90.016		
	Encoder Count	pulses	16381		16387		
	Trunnion Angle Counter	deg	44.66		45.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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EQUIPMENT TEST
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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(10)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+50° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (20°)	arc min		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	99.984		100.016		
	Encoder Count	pulses	18201		18207		
	Trunnion Angle Counter	deg	49.66		50.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(11)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+54° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (23°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	107.984		108.016		
	Encoder Count	pulses	19658		19664		
	Trunnion Angle Counter	deg	53.66		54.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(12)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+57° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (27°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	113.984		114.016		
	Encoder Count	pulses	20750		20756		
	Trunnion Angle Counter	deg	56.66		57.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(9)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	89.984		90.016		
	Encoder Count	pulses	16381		16387		
	Trunnion Angle Counter	deg	44.66		45.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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EQUIPMENT TEST
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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(10)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+50° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (20°)	arc min		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	99.984		100.016		
	Encoder Count	pulses	18201		18207		
	Trunnion Angle Counter	deg	49.66		50.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(11)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+54° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (23°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	107.984		108.016		
	Encoder Count	pulses	19658		19664		
	Trunnion Angle Counter	deg	53.66		54.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(12)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+57° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (27°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	113.984		114.016		
	Encoder Count	pulses	20750		20756		
	Trunnion Angle Counter	deg	56.66		57.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(13)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		(+)0° 00' 00"			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	359.984		0.016		
	Encoder Count	pulses	-3		+3		
	Trunnion Angle Counter	deg	359.66		0.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(1)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+44° 58' 30"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.934		89.966		
e.	2X TRUNNION CDU	deg	89.934		89.966		
h.	2X TRUNNION CDU	deg	89.934		89.966		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16372		16378		
e.	Encoder Count	pulses	16372		16378		
h.	Encoder Count	pulses	16372		16378		

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EQUIPMENT TEST
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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(2)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+44° 59' 00"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.951		89.983		
e.	2X TRUNNION CDU	deg	89.951		89.983		
h.	2X TRUNNION CDU	deg	89.951		89.983		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16375		16381		
e.	Encoder Count	pulses	16375		16381		
h.	Encoder Count	pulses	16375		16381		

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(3)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+44° 59' 30"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.967		89.999		
e.	2X TRUNNION CDU	deg	89.967		89.999		
h.	2X TRUNNION CDU	deg	89.967		89.999		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16378		16384		
e.	Encoder Count	pulses	16378		16384		
h.	Encoder Count	pulses	16378		16384		

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(13)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		(+)0° 00' 00"			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	359.984		0.016		
	Encoder Count	pulses	-3		+3		
	Trunnion Angle Counter	deg	359.66		0.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(1)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+44° 58' 30"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.934		89.966		
e.	2X TRUNNION CDU	deg	89.934		89.966		
h.	2X TRUNNION CDU	deg	89.934		89.966		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16372		16378		
e.	Encoder Count	pulses	16372		16378		
h.	Encoder Count	pulses	16372		16378		

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DATA SHEET 15 **OF** 21.

JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(2)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+44° 59' 00"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.951		89.983		
e.	2X TRUNNION CDU	deg	89.951		89.983		
h.	2X TRUNNION CDU	deg	89.951		89.983		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16375		16381		
e.	Encoder Count	pulses	16375		16381		
h.	Encoder Count	pulses	16375		16381		

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(3)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+44° 59' 30"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.967		89.999		
e.	2X TRUNNION CDU	deg	89.967		89.999		
h.	2X TRUNNION CDU	deg	89.967		89.999		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16378		16384		
e.	Encoder Count	pulses	16378		16384		
h.	Encoder Count	pulses	16378		16384		

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(4)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+45° 00' 00"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ε TC (15°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
b.	2X TRUNNION CDU	deg	89.984		90.016		
e.	2X TRUNNION CDU	deg	89.984		90.016		
h.	2X TRUNNION CDU	deg	89.984		90.016		
i.	2X TRUNNION CDU from step B.1.b data sheet 10.	deg	▨		▨	▨	▨
i.	(Max - Min) 2X TRUNNION CDU	deg	▨		▨	▨	▨
b.	Encoder Count	pulses	16381		16387		
e.	Encoder Count	pulses	16381		16387		
h.	Encoder Count	pulses	16381		16387		

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(5)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+45° 00' 30"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ε TC (15°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
b.	2X TRUNNION CDU	deg	90.001		90.033		
e.	2X TRUNNION CDU	deg	90.001		90.033		
h.	2X TRUNNION CDU	deg	90.001		90.033		
i.	(Max. - Min.) 2X TRUNNION CDU	deg	▨		▨	▨	▨
b.	Encoder Count	pulses	16384		16390		
e.	Encoder Count	pulses	16384		16390		
h.	Encoder Count	pulses	16384		16390		

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JDC
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REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(6)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+45° 01' 00"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ε TC (15°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
b.	2X TRUNNION CDU	deg	90.017		90.049		
e.	2X TRUNNION CDU	deg	90.017		90.049		
h.	2X TRUNNION CDU	deg	90.017		90.049		
i.	(Max. - Min.) 2X TRUNNION CDU	deg	▨		▨	▨	▨
b.	Encoder Count	pulses	16387		16393		
e.	Encoder Count	pulses	16387		16393		
h.	Encoder Count	pulses	16387		16393		

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(7)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+45° 01' 30"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ε TC (15°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
b.	2X TRUNNION CDU	deg	90.034		90.066		
e.	2X TRUNNION CDU	deg	90.034		90.066		
h.	2X TRUNNION CDU	deg	90.034		90.066		
i.	(Max. - Min.) 2X TRUNNION CDU	deg	▨		▨	▨	▨
b.	Encoder Count	pulses	16390		16396		
e.	Encoder Count	pulses	16390		16396		
h.	Encoder Count	pulses	16390		16396		

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(4)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.984		90.016		
e.	2X TRUNNION CDU	deg	89.984		90.016		
h.	2X TRUNNION CDU	deg	89.984		90.016		
i.	2X TRUNNION CDU from step B.1.b data sheet 9	deg					
i.	(Max - Min) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16381		16387		
e.	Encoder Count	pulses	16381		16387		
h.	Encoder Count	pulses	16381		16387		

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(5)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 00' 30"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	90.001		90.033		
e.	2X TRUNNION CDU	deg	90.001		90.033		
h.	2X TRUNNION CDU	deg	90.001		90.033		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16384		16390		
e.	Encoder Count	pulses	16384		16390		
h.	Encoder Count	pulses	16384		16390		

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(6)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 01' 00"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	90.017		90.049		
e.	2X TRUNNION CDU	deg	90.017		90.049		
h.	2X TRUNNION CDU	deg	90.017		90.049		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16387		16393		
e.	Encoder Count	pulses	16387		16393		
h.	Encoder Count	pulses	16387		16393		

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JDC
NO. 10709
REV. B

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(7)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 01' 30"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ_{TC} (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	90.034		90.066		
e.	2X TRUNNION CDU	deg	90.034		90.066		
h.	2X TRUNNION CDU	deg	90.034		90.066		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16390		16396		
e.	Encoder Count	pulses	16390		16396		
h.	Encoder Count	pulses	16390		16396		

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JDC
NO. 10709
REV. E

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6	2X TRUNNION CDU	deg	▨		▨	▨	▨
B.7	2X TRUNNION CDU	deg	180.000		200.000		
B.10	2X TRUNNION CDU	deg	340.000		000.000		

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JDC
NO. 10709
REV. E

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6	2X TRUNNION CDU	deg	▨		▨	▨	▨
B.7	2X TRUNNION CDU	deg	180.000		200.000		
B.10	2X TRUNNION CDU	deg	340.000		000.000		

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Released with ATP 1009502

JOB SXT TRUNNION ACCURACY AND LIMITS TEST | **JDC** 10709 **REV.** C **PAGE** 1 **OF** 4
INITIAL TDRR 19950 **D.S. PGS** 21

SUBSYSTEM OPTICAL | **ASSY.**

DESCRIPTION SXT trunnion accuracy is checked by comparing SCT panel trunnion angle counter, 2X TRUNNION CDU readout, and trunnion encoder output with Rotary Table Angles. Trunnion limits are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA
A	9-16-65	22523	1, 3	All	MGM	TM
B	12-14-65	24742	-	17	WK	-
C	8-4-66	30394	2	-	EA	-

REFERENCES ATP 1009502, Paragraphs 3-3.4, 3-3.10, and JDC's 10734 and 10706

IMPORTANT JDC 10706 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

NOTE: Assure that the Counter, Phase Angle Voltmeter (PAVM), and 5-inch autocollimator reticle lamp have been energized a minimum of 15 minutes immediately prior to use in this test.

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

OIA ON
OPTICS POWER ON
BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

ZERO OPTICS
CONTROLLER DIRECT
SCT DRIVE NORMAL
SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

TRACKER
TRACKER POWER.

5. Set switches as follows:

SHAFT SLEW CONTROL to OFF
TRUNNION SLEW CONTROL to OFF
SLAVE TELESCOPE to STAR LOS.

---

6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

7. Adjust the BRIGHTNESS control (inside the side access panel of the Remote Optics Controller) until the SXT reticle illumination is at a comfortable level.

8. Connect the 2X TRUNNION CDU encoder output to the Counter by setting the COUNTER INPUT "A" OR "AB" selector on Primary Signal Selector panel to 16.

9. Set selectors on Counter to perform forward-reverse counting function as follows:

DISPLAY TIME (N_3) to 10^5
DISPLAY RESET to ZERO
CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to COUNT
INPUT SELECTOR to A-B
SENSE SELECTOR to FWD.

10. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on Remote Optics Controller to drive 2X TRUNNION CDU while adjusting ATTEN, SLOPE, and TRIGGER switches and controls on channels A and B of the Counter.

11. Press the MANUAL/ZERO OPTICS pushbutton to light the ZERO OPTICS indicator.

12. After the CDU's have zeroed, press the RESET pushbutton on the counter.

13. Press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

14. Connect 2X TRUNNION CDU 16X resolver error output to PAVM by setting Primary Signal Selector to 206.

15. Set the FREQUENCY switch on the PAVM to 800 ~ NO. 1.

16. Use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.

NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, offsetting the vernier knob before each reading.

17. Set the tilt axis of the Rotary Table to 0° 00' 00" (±1").

B. PROCEDURE

1. Add each of the incremental angles in the following table to the ZRP established in JDC 10706. If the sum is greater than 360°, subtract 360°. Subtract the respective table rotary axis calibration errors obtained from the calibration chart. Position the Rotary Table rotary axis to within ±1 arc second of each of the calculated angles. At each Rotary Table setting, perform the following steps:

---

a. Sight through the SXT eyepiece and use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller to position the 5-inch autocollimator reticle at the center of the SXT reticle. Use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to adjust the SXT shaft angle if necessary.

b. Record 2X TRUNNION CDU, Counter, and SCT panel trunnion angle counter indications.

c. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of 2X TRUNNION CDU 16X resolver error signal.

INCREMENTAL ANGLES - STEP B. 1

(1)	0°	00'	00"
(2)	4°	00'	00"
(3)	11°	00'	00"
(4)	16°	00'	00"
(5)	22°	00'	00"

INCREMENTAL ANGLES - STEP B. 1 (cont)

(6)	30°	00'	00"
(7)	36°	00'	00"
(8)	40°	00'	00"
(9)	45°	00'	00"
(10)	50°	00'	00"
(11)	54°	00'	00"
(12)	57°	00'	00"
(13)	0°	00'	00"

2. Add each of the incremental angles in the following table to the ZRP established in JDC 10706. Subtract the respective table rotary axis calibration error obtained from the calibration chart. Rotate the Rotary Table to within ±1 arc second of each of the calculated angles. At each Rotary Table setting, perform the following steps:

a. Repeat step B. 1. a.

b. Record 2X TRUNNION CDU and Counter indications.

c. Use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the 2X TRUNNION CDU indication to approximately 80. 000.

d. Repeat step B. 1. a.

e. Record 2X TRUNNION CDU and Counter indications.

f. Repeat step B. 2. c.

g. Repeat step B. 1. a.

h. Record 2X TRUNNION CDU and Counter indications.

---

i. Calculate and record the difference between the maximum and minimum 2X TRUNNION CDU indications recorded in steps B. 2. b, B. 2. e and B. 2. h. For the 45° 00' 00" increment, calculate and record the difference between the maximum and minimum 2X TRUNNION CDU indications recorded in steps B. 1. b, B. 2. b, B. 2. e and B. 2. h.

INCREMENTAL ANGLES - STEP B. 2

(1)	44°	58'	30"
(2)	44°	59'	00"
(3)	44°	59'	30"
(4)	45°	00'	00"
(5)	45°	00'	30"
(6)	45°	01'	00"
(7)	45°	01'	30"

3. Install Portable Light Assembly to SXT eyepiece and energize the Illuminator lamp. Adjust the light intensity to a comfortable level.

4. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive 2X TRUNNION CDU to approximately 175°.

5. Set the COARSE GAIN CONTROL switch to LO.

NOTE: Alignment of the reflected reticle image in step B. 6 will be obtained at the SXT trunnion self-autocollimation angle at a nominal 2X TRUNNION CDU indication of 180. 000.

6. Sight through the SXT eyepiece and use the TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL to align the reticle image to the reflected reticle image. Record the 2X TRUNNION CDU indication.

7. Using TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL, drive SXT trunnion in the positive direction until the 2X TRUNNION CDU dials stop moving. Record the 2X TRUNNION CDU indication.

8. Press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the ZERO OPTICS indicator.

9. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

10. Using TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL, drive SXT trunnion in the negative direction until the 2X TRUNNION CDU dials stop moving. Record the 2X TRUNNION CDU indication

11. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

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NO. 10709
REV. C
INITIAL TDRR 19350

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

ASSEMBLY UNDER TEST

TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY

DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT

NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(1)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+0° 00' 00"			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	359.984		0.016		
	Encoder Count	pulses	-3		+3		
	Trunnion Angle Counter	deg	359.66		0.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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REV. C

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(2)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		(+)4° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (335°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	7.984		8.016		
	Encoder Count	pulses	1453		1459		
	Trunnion Angle Counter	deg	3.66		4.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(3)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+11° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (340°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	21.984		22.016		
	Encoder Count	pulses	4002		4008		
	Trunnion Angle Counter	deg	10.66		11.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
NO. 10709
REV. C

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(4)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+16° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (345°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	31.984		32.016		
	Encoder Count	pulses	5823		5829		
	Trunnion Angle Counter	deg	15.66		16.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(5)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+22° 00' 00"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	*TC (350°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
	2X TRUNNION CDU	deg	43.984		44.016		
	Encoder Count	pulses	8007		8013		
	Trunnion Angle Counter	deg	21.66		22.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv	▨		▨	▨	▨
	2X TRUNNION CDU 16X Quadrature Voltage	mv	▨		▨	▨	▨

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(6)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+30° 00' 00"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	*TC (0°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
	2X TRUNNION CDU	deg	59.984		60.016		
	Encoder Count	pulses	10920		10926		
	Trunnion Angle Counter	deg	29.66		30.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv	▨		▨	▨	▨
	2X TRUNNION CDU 16X Quadrature Voltage	mv	▨		▨	▨	▨

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(7)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+36° 00' 00"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	*TC (5°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
	2X TRUNNION CDU	deg	71.984		72.016		
	Encoder Count	pulses	13105		13111		
	Trunnion Angle Counter	deg	35.66		36.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv	▨		▨	▨	▨
	2X TRUNNION CDU 16X Quadrature Voltage	mv	▨		▨	▨	▨

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(8)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+40° 00' 00"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	*TC (10°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
	2X TRUNNION CDU	deg	79.984		80.016		
	Encoder Count	pulses	14561		14567		
	Trunnion Angle Counter	deg	39.66		40.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv	▨		▨	▨	▨
	2X TRUNNION CDU 16X Quadrature Voltage	mv	▨		▨	▨	▨

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(9)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	89.984		90.016		
	Encoder Count	pulses	16381		16387		
	Trunnion Angle Counter	deg	44.66		45.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC NO. 10709
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(10)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+50° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (20°)	arc min		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	99.984		100.016		
	Encoder Count	pulses	18201		18207		
	Trunnion Angle Counter	deg	49.66		50.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(11)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+54° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (23°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	107.984		108.016		
	Encoder Count	pulses	19658		19664		
	Trunnion Angle Counter	deg	53.66		54.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(12)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+57° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (27°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	113.984		114.016		
	Encoder Count	pulses	20750		20756		
	Trunnion Angle Counter	deg	56.66		57.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
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REV. C

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(13)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	(+)0° 00' 00"	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
	2X TRUNNION CDU	deg	359.984		0.016		
	Encoder Count	pulses	-3		+3		
	Trunnion Angle Counter	deg	359.66		0.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv	▨		▨	▨	▨
	2X TRUNNION CDU 16X Quadrature Voltage	mv	▨		▨	▨	▨

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(1)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+44° 58' 30"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ϵ_{TC} (15°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
b.	2X TRUNNION CDU	deg	89.934		89.966		
e.	2X TRUNNION CDU	deg	89.934		89.966		
h.	2X TRUNNION CDU	deg	89.934		89.966		
i.	(Max. - Min.) 2X TRUNNION CDU	deg	▨		▨	▨	▨
b.	Encoder Count	pulses	16372		16378		
e.	Encoder Count	pulses	16372		16378		
h.	Encoder Count	pulses	16372		16378		

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(2)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+44° 59' 00"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ϵ_{TC} (15°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
b.	2X TRUNNION CDU	deg	89.951		89.983		
e.	2X TRUNNION CDU	deg	89.951		89.983		
h.	2X TRUNNION CDU	deg	89.951		89.983		
i.	(Max. - Min.) 2X TRUNNION CDU	deg	▨		▨	▨	▨
b.	Encoder Count	pulses	16375		16381		
e.	Encoder Count	pulses	16375		16381		
h.	Encoder Count	pulses	16375		16381		

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(3)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+44° 59' 30"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ϵ_{TC} (15°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
b.	2X TRUNNION CDU	deg	89.967		89.999		
e.	2X TRUNNION CDU	deg	89.967		89.999		
h.	2X TRUNNION CDU	deg	89.967		89.999		
i.	(Max. - Min.) 2X TRUNNION CDU	deg	▨		▨	▨	▨
b.	Encoder Count	pulses	16378		16384		
e.	Encoder Count	pulses	16378		16384		
h.	Encoder Count	pulses	16378		16384		

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(4)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ TC (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.984		90.016		
e.	2X TRUNNION CDU	deg	89.984		90.016		
h.	2X TRUNNION CDU	deg	89.984		90.016		
i.	2X TRUNNION CDU from step B.1.b data sheet 9	deg					
i.	(Max - Min) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16381		16387		
e.	Encoder Count	pulses	16381		16387		
h.	Encoder Count	pulses	16381		16387		

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(5)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 00' 30"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ TC (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	90.001		90.033		
e.	2X TRUNNION CDU	deg	90.001		90.033		
h.	2X TRUNNION CDU	deg	90.001		90.033		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16384		16390		
e.	Encoder Count	pulses	16384		16390		
h.	Encoder Count	pulses	16384		16390		

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(6)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 01' 00"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ TC (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	90.017		90.049		
e.	2X TRUNNION CDU	deg	90.017		90.049		
h.	2X TRUNNION CDU	deg	90.017		90.049		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16387		16393		
e.	Encoder Count	pulses	16387		16393		
h.	Encoder Count	pulses	16387		16393		

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(7)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 01' 30"			
	ZRP + Increment	deg min sec		° ' "			
	ϵ TC (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	90.034		90.066		
e.	2X TRUNNION CDU	deg	90.034		90.066		
h.	2X TRUNNION CDU	deg	90.034		90.066		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16390		16396		
e.	Encoder Count	pulses	16390		16396		
h.	Encoder Count	pulses	16390		16396		

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6	2X TRUNNION CDU	deg	▨		▨	▨	▨
B.7	2X TRUNNION CDU	deg	180.000		200.000		
B.10	2X TRUNNION CDU	deg	340.000		000.000		

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Released with ATP 1009502

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

INITIAL TDRR 19950 D.S. PGS 22

SUBSYSTEM OPTICAL

ASSY.

DESCRIPTION SXT trunnion accuracy is checked by comparing SCT panel trunnion angle counter, 2X TRUNNION CDU readout, and trunnion encoder output with Rotary Table Angles. Trunnion limits are also checked.

Rev. Let.	Date	TDRR NO.	PAGES REVISED		APPROVAL	
			JDC	D.S.	MIT	NASA

REFERENCES ATP 1009502, Paragraphs 3-3.5, 3-3.11, and 3-3.14.2, JDC 10734, 10706

IMPORTANT JDC 10706 shall have been performed.

INTERVAL

TOOLS AND MATERIAL

NOTE: Assure that the Counter, Phase Angle Voltmeter (PAVM), and 5-inch autocollimator reticle lamp have been energized a minimum of 15 minutes immediately prior to use in this test.

A. PREPARATION

1. Assure that the Remote Optics Controller is connected to cable W87 as shown in JDC 10734.

2. Assure that the following pushbuttons on the Test Control panel are lighted:

OIA ON/ISS POWER DISABLED
OPTICS POWER ON
BLOCK I SERIES 100.

3. Assure that the following pushbutton and indicators on the Remote Optics Controller are lighted:

ZERO OPTICS
CONTROLLER DIRECT
SCT DRIVE NORMAL
SXT DRIVE NORMAL.

4. Assure that the following pushbuttons are not lighted:

TRACKER
TRACKER POWER.

5. Set switches as follows:

SHAFT SLEW CONTROL to OFF
TRUNNION SLEW CONTROL to OFF
SLAVE TELESCOPE to STAR LOS.

VERIFICATION WITH SIDL REQUIRED BEFORE USE DATE ______

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC 10709 REV - PAGE 2 OF 4

SUBSYSTEM OPTICAL

ASSY

6. After CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the MANUAL indicator.

7. Adjust the BRIGHTNESS control (inside the side access panel of the Remote Optics Controller) until the SXT reticle illumination is at a comfortable level.

8. Connect the 2X TRUNNION CDU encoder output to the Counter by setting the COUNTER INPUT "A" OR "AB" selector on Primary Signal Selector panel to 16.

9. Set selectors on Counter to perform forward-reverse counting function as follows:

DISPLAY TIME (N_s) to 10^5
DISPLAY RESET to ZERO
CLOCK FREQUENCY DIVIDER to 1
CLOCK SELECTOR to INT
FUNCTION to COUNT
INPUT SELECTOR to A-B
SENSE SELECTOR to FWD.

10. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on Remote Optics Controller to drive 2X TRUNNION CDU while adjusting ATTEN, SLOPE, and TRIGGER switches and controls on channels A and B of the Counter.

11. Press the MANUAL/ZERO OPTICS pushbutton to light the ZERO OPTICS indicator.

12. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

13. Connect 2X TRUNNION CDU 16X resolver error output to PAVM by setting Primary Signal Selector to 206.

14. Set the FREQUENCY switch on the PAVM to 800~ NO. 1.

15. Use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the SHAFT ANGLE CDU to 270.000 (±0.005)°.

16. Press the RESET pushbutton on Counter.

NOTE: When positioning the Rotary Table, always approach the final setting in the increasing direction. To determine Rotary Table indications, take the average of a set of five readings of the optigon arc-second scale, offsetting the vernier knob before each reading.

17. Set the tilt axis of the Rotary Table to 0° 00' 00" (±1").

B. PROCEDURE

1. Add each of the incremental angles in the following table to the ZRP established

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC 10709 REV - PAGE 3 OF 4

SUBSYSTEM OPTICAL

ASSY

in JDC 10706. If the sum is greater than 360°, subtract 360°. Subtract the respective table rotary axis calibration errors obtained from the calibration chart. Position the Rotary Table rotary axis to within ±1 arc second of each of the calculated angles. At each Rotary Table setting, perform the following steps:

a. Sight through the SXT eyepiece and use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL on the Remote Optics Controller to position the 5-inch autocollimator reticle at the center of the SXT reticle. Use the SHAFT SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to adjust the SXT shaft angle if necessary.

b. Record 2X TRUNNION CDU, Counter, and SCT panel trunnion angle counter indications.

c. Monitor the PAVM to determine and record magnitude and sign of in-phase and quadrature components of 2X TRUNNION CDU 16X resolver error signal.

INCREMENTAL ANGLES - STEP B.1

(1)	0°	00'	00"
(2)	5°	00'	00"
(3)	10°	00'	00"
(4)	15°	00'	00"
(5)	20°	00'	00"

INCREMENTAL ANGLES - STEP B.1 (cont)

(6)	25°	00'	00"
(7)	30°	00'	00"
(8)	35°	00'	00"
(9)	40°	00'	00"
(10)	45°	00'	00"
(11)	50°	00'	00"
(12)	53°	00'	00"
(13)	57°	00'	00"
(14)	0°	00'	00"

2. Add each of the incremental angles in the following table to the ZRP established in JDC 10706. Subtract the respective table rotary axis calibration error obtained from the calibration chart. Rotate the Rotary Table to within ±1 arc second of each of the calculated angles. At each Rotary Table setting, perform the following steps:

a. Repeat step B.1.a.

b. Record 2X TRUNNION CDU and Counter indications.

c. Use the TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive the 2X TRUNNION CDU indication to approximately 80.000.

d. Repeat step B.1.a.

e. Record 2X TRUNNION CDU and Counter indications.

f. Repeat step B.2.c.

g. Repeat step B.1.a.

h. Record 2X TRUNNION CDU and Counter indications.

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC 10709 REV - PAGE 4 OF 4

SUBSYSTEM OPTICAL

ASSY

1. Calculate and record the difference between the maximum and minimum 2X TRUNNION CDU indications recorded in steps B.2.b, B.2.e and B.2.h. For the 45° 00' 00" increment, calculate and record the difference between the maximum and minimum 2X TRUNNION CDU indications recorded in steps B.1.b, B.2.b, B.2.e and B.2.h.

INCREMENTAL ANGLES - STEP B.2

(1)	44°	58'	30"
(2)	44°	59'	00"
(3)	44°	59'	30"
(4)	45°	00'	00"
(5)	45°	00'	30"
(6)	45°	01'	00"
(7)	45°	01'	30"

3. Install Portable Light Assembly to SXT eyepiece and energize the Illuminator lamp. Adjust the light intensity to a comfortable level.

4. Use TRUNNION SLEW CONTROL switch and COARSE and FINE GAIN CONTROL to drive 2X TRUNNION CDU to approximately 175°.

5. Set the COARSE GAIN CONTROL switch to LO.

NOTE: Alignment of the reflected reticle image in step B.6 will be obtained at the SXT trunnion self-autocollimation angle at a nominal 2X TRUNNION CDU indication of 180.000.

6. Sight through the SXT eyepiece and use the TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL to align the reticle image to the reflected reticle image. Record the 2X TRUNNION CDU indication.

7. Using TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL, drive SXT trunnion in the positive direction until the 2X TRUNNION CDU dials stop moving. Record the 2X TRUNNION CDU indication.

8. Press the MANUAL/ZERO OPTICS pushbutton on Remote Optics Controller to light the ZERO OPTICS indicator.

9. After the CDU's have zeroed, press the MANUAL/ZERO OPTICS pushbutton to light the MANUAL indicator.

10. Using TRUNNION SLEW CONTROL switch and FINE GAIN CONTROL, drive SXT trunnion in the negative direction until the 2X TRUNNION CDU dials stop moving. Record the 2X TRUNNION CDU indication.

11. Remove the Portable Light Assembly and replace the cover on the SXT eyepiece assembly.

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

ASSEMBLY UNDER TEST
TITLE ____
SER. NO. ____ DWG ____ REV. ____

TEST HISTORY
DATE ____ START ____ END ____ SITE / LOCATION
TIME ____ START ____ END ____ TOTAL ELAPSED

MAJOR GROUND SUPPORT EQUIPMENT
NAME ____ SER. NO. ____ CAL DATE
NAME ____ SER. NO. ____ CAL DATE

CONDUCTED BY ____ NAME/AFFILIATION APPROVED BY ____ NAME/AFFILIATION

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(1)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+0° 00' 00"			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	359.984		0.016		
	Encoder Count	pulses	-3		+3		
	Trunnion Angle Counter	deg	359.66		0.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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APOLLO G&N
EQUIPMENT TEST
DATA SHEET 2 OF 22

JDC
NO. 10709
REV. -

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(2)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		(+)5° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	⁎TC (335°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	9.984		10.016		
	Encoder Count	pulses	1817		1823		
	Trunnion Angle Counter	deg	4.66		5.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

DATE ____

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(3)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+10° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	⁎TC (340°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	19.984		20.016		
	Encoder Count	pulses	3638		3644		
	Trunnion Angle Counter	deg	9.66		10.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

DATE ____

APOLLO G&N
EQUIPMENT TEST
DATA SHEET 4 OF 22

JDC
NO. 10709
REV. -

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B. 1(4)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+15° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	⁎TC (345°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	29.984		30.016		
	Encoder Count	pulses	5458		5464		
	Trunnion Angle Counter	deg	14.66		15.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

DATE ____

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 5 **OF** 22

JDC
NO. 10709
REV. -

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(5)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+20° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (350°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	39.984		40.016		
	Encoder Count	pulses	7279		7285		
	Trunnion Angle Counter	deg	19.66		20.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

DATE ________

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EQUIPMENT TEST
DATA SHEET 6 **OF** 22

JDC
NO. 10709
REV. -

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(6)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+25° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (355°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	49.984		50.016		
	Encoder Count	pulses	9099		9105		
	Trunnion Angle Counter	deg	24.66		25.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

DATE ________

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EQUIPMENT TEST
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JDC
NO 10709
REV. -

JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(7)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+30° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (0°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	59.984		60.016		
	Encoder Count	pulses	10920		10926		
	Trunnion Angle Counter	deg	29.66		30.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

DATE ________

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC. ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(8)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+35° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (5°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	69.984		70.016		
	Encoder Count	pulses	12740		12746		
	Trunnion Angle Counter	deg	34.66		35.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

DATE ________

APOLLO G & N
EQUIPMENT TEST
DATA SHEET 9 OF 22

JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(9)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+40° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (10°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	79.984		80.016		
	Encoder Count	pulses	14561		14567		
	Trunnion Angle Counter	deg	39.66		40.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 10 OF 22

JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(10)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+45° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	89.984		90.016		
	Encoder Count	pulses	16381		16387		
	Trunnion Angle Counter	deg	44.66		45.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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APOLLO G & N
EQUIPMENT TEST
DATA SHEET 11 OF 22

JDC
NO. 10709
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(11)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+50° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (20°)	arc min		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	99.984		100.016		
	Encoder Count	pulses	18201		18207		
	Trunnion Angle Counter	deg	49.66		50.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(12)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+53° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	*TC (23°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	105.984		106.016		
	Encoder Count	pulses	19294		19300		
	Trunnion Angle Counter	deg	52.66		53.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(13)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+57° 00' 00"			
	ZRP + Increment	deg min sec		° ' "			
	εTC (27°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	113.984		114.016		
	Encoder Count	pulses	20750		20756		
	Trunnion Angle Counter	deg	56.66		57.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.1(14)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		(+)0° 00' 00"			
	Rotary Table Position	deg min sec		° ' "			
	2X TRUNNION CDU	deg	359.984		0.016		
	Encoder Count	pulses	-3		+3		
	Trunnion Angle Counter	deg	359.66		0.34		
	2X TRUNNION CDU 16X In-Phase Voltage	mv					
	2X TRUNNION CDU 16X Quadrature Voltage	mv					

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EQUIPMENT TEST
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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(1)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+44° 58' 30"			
	ZRP + Increment	deg min sec		° ' "			
	εTC (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.934		89.966		
e.	2X TRUNNION CDU	deg	89.934		89.966		
h.	2X TRUNNION CDU	deg	89.934		89.966		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16372		16378		
e.	Encoder Count	pulses	16372		16378		
h.	Encoder Count	pulses	16372		16379		

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EQUIPMENT TEST
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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(2)	Rotary Table ZRP from JDC 10706	deg min sec		° ' "			
	Rotary Table Increment	deg min sec		+44° 59' 00"			
	ZRP + Increment	deg min sec		° ' "			
	εTC (15°)	arc sec		(-) "			
	Rotary Table Position	deg min sec		° ' "			
b.	2X TRUNNION CDU	deg	89.951		89.983		
e.	2X TRUNNION CDU	deg	89.951		89.983		
h.	2X TRUNNION CDU	deg	89.951		89.983		
i.	(Max. - Min.) 2X TRUNNION CDU	deg					
b.	Encoder Count	pulses	16375		16381		
e.	Encoder Count	pulses	16375		16381		
h.	Encoder Count	pulses	16375		16381		

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC
NO. 10709
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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(3)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+44° 59' 30"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ϵ_{TC} (15°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
b.	2X TRUNNION CDU	deg	89.967		89.999		
e.	2X TRUNNION CDU	deg	89.967		89.999		
h.	2X TRUNNION CDU	deg	89.967		89.999		
i.	(Max. - Min.) 2X TRUNNION CDU	deg	▨		▨	▨	▨
b.	Encoder Count	pulses	16378		16384		
e.	Encoder Count	pulses	16378		16384		
h.	Encoder Count	pulses	16378		16384		

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC
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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(4)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+45° 00' 00"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ϵ_{TC} (15°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
b.	2X TRUNNION CDU	deg	89.984		90.016		
e.	2X TRUNNION CDU	deg	89.984		90.016		
h.	2X TRUNNION CDU	deg	89.984		90.016		
i.	2X TRUNNION CDU from step B.1.b data sheet 10.	deg	▨		▨	▨	▨
i.	(Max - Min) 2X TRUNNION CDU	deg	▨		▨	▨	▨
b.	Encoder Count	pulses	16381		16387		
e.	Encoder Count	pulses	16381		16387		
h.	Encoder Count	pulses	16381		16387		

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC
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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(5)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+45° 00' 30"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ϵ_{TC} (15°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
b.	2X TRUNNION CDU	deg	90.001		90.033		
e.	2X TRUNNION CDU	deg	90.001		90.033		
h.	2X TRUNNION CDU	deg	90.001		90.033		
i.	(Max. - Min.) 2X TRUNNION CDU	deg	▨		▨		
b.	Encoder Count	pulses	16384		16390		
e.	Encoder Count	pulses	16384		16390		
h.	Encoder Count	pulses	16384		16390		

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC
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JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(6)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+45° 01' 00"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ϵ_{TC} (15°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
b.	2X TRUNNION CDU	deg	90.017		90.049		
e.	2X TRUNNION CDU	deg	90.017		90.049		
h.	2X TRUNNION CDU	deg	90.017		90.049		
i.	(Max. - Min.) 2X TRUNNION CDU	deg	▨		▨	▨	▨
b.	Encoder Count	pulses	16387		16393		
e.	Encoder Count	pulses	16387		16393		
h.	Encoder Count	pulses	16387		16393		

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JDC
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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.2(7)	Rotary Table ZRP from JDC 10706	deg min sec	▨	° ' "	▨	▨	▨
	Rotary Table Increment	deg min sec	▨	+45° 01' 30"	▨	▨	▨
	ZRP + Increment	deg min sec	▨	° ' "	▨	▨	▨
	ϵ_{TC} (15°)	arc sec	▨	(-) "	▨	▨	▨
	Rotary Table Position	deg min sec	▨	° ' "	▨	▨	▨
b.	2X TRUNNION CDU	deg	90.034		90.066		
e.	2X TRUNNION CDU	deg	90.034		90.066		
h.	2X TRUNNION CDU	deg	90.034		90.066		
i.	(Max. - Min.) 2X TRUNNION CDU	deg	▨		▨	▨	▨
b.	Encoder Count	pulses	16390		16396		
e.	Encoder Count	pulses	16390		16396		
h.	Encoder Count	pulses	16390		16396		

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JOB SXT TRUNNION ACCURACY AND LIMITS TEST

JDC ITEM NO.	PARAMETER	UNITS	MIN VALUE	RECORDED VALUE	MAX VALUE	REJ	ACC
B.6	2X TRUNNION CDU	deg	▨		▨	▨	▨
B.7	2X TRUNNION CDU	deg	180.000		200.000		
B.10	2X TRUNNION CDU	deg	340.000		000.000		

DATE ________